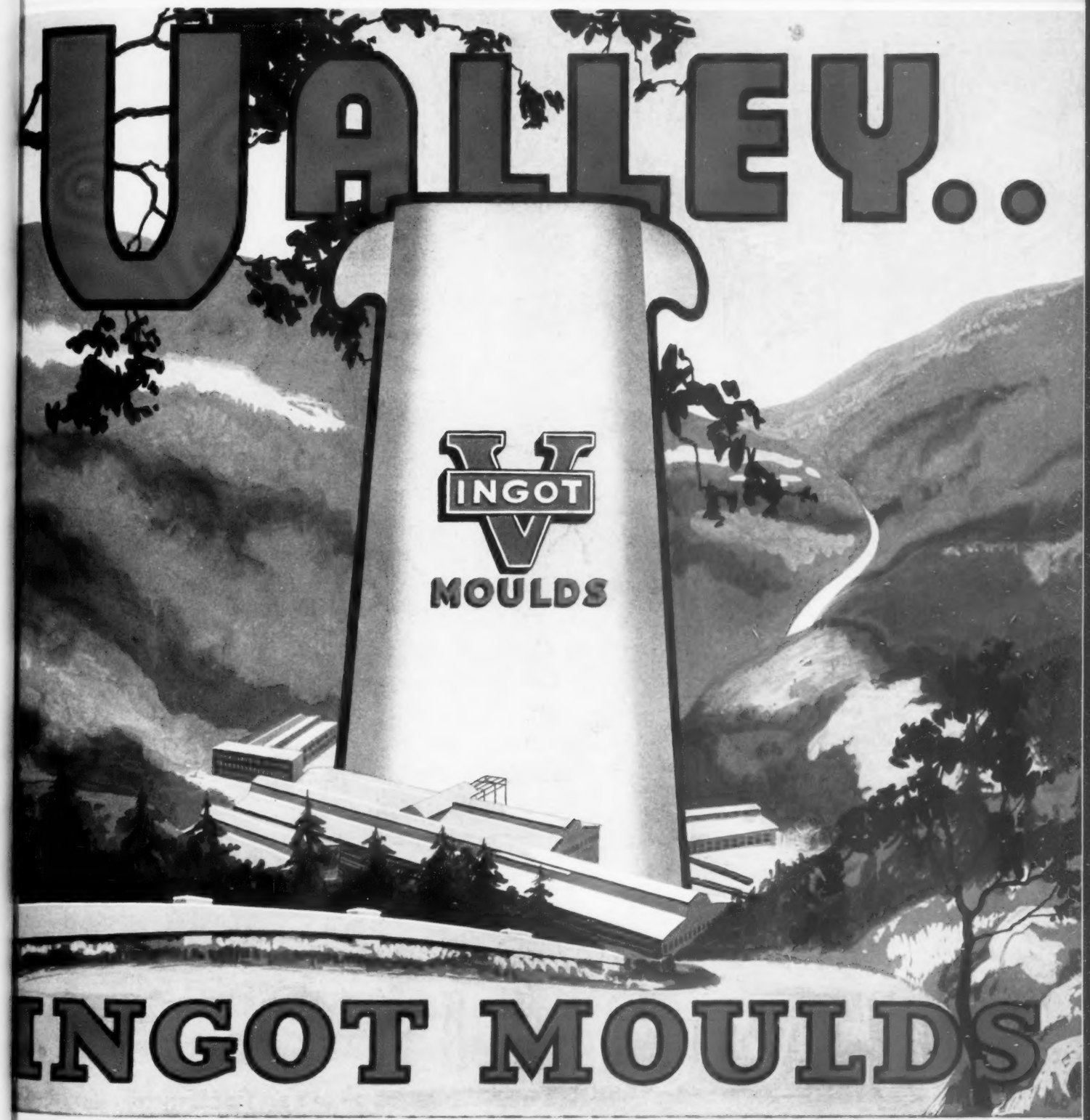
October 7, 1935

PERIODICAL ROOM
GENERAL LIBRARY
U. OF MICH.

STEEL

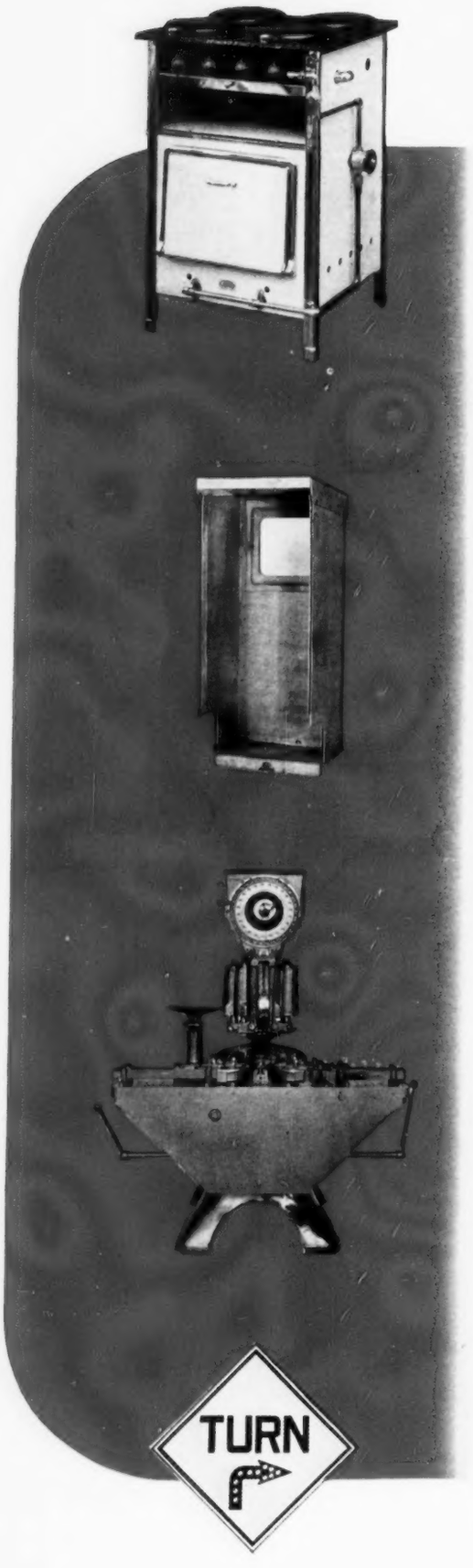
PRODUCTION • PROCESSING • DISTRIBUTION • USE
FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW



VALLEY MOULD AND IRON CORPORATION

Plants: Hubbard, Ohio • Sharpsville, Pa. • Chicago, Ill. • *Main Office:* Hubbard, Ohio

Western Office: 108th Street and Calumet River, South Chicago, Illinois



REPUBLIC GALVANNEALED *insures* adequate protection

Any coating on iron or steel affords protection against rust only to the degree that it adheres to the base metal. It is because of the adhesion of the protective coating of zinc on Republic Galvannealed that these sheets are today being used for a wide variety of application, particularly in the making of devices where considerable forming of the sheet is involved. Made up into stoves, cabinets, soft drink dispensers, refrigerators and industrial and institutional equipment of all kinds, Republic Galvannealed affords true protection.

In its manufacture, iron or steel sheets are dipped into molten zinc. Instead of being permitted to cool quickly as in galvanizing, the coated sheets are kept at a temperature high enough to cause the zinc and the iron to alloy. The resulting iron-zinc alloy thus becomes an integral part of the sheet with no sharp line of demarcation between the two elements. In fabrication, this protective coating aheres to the metal. It also affords a fine surface for decorative finishes, requiring no expensive preparation and taking paint, lacquer or enamel far better than a galvanized surface.

Illustrated descriptive literature sent on request.

REPUBLIC STEEL

Republic Steel

CORPORATION

GENERAL OFFICES · · · YOUNGSTOWN, OHIO

Vol. 97, No. 15, Oct. 7, 1935 issue of STEEL, published weekly at Cleveland, O. Entered as second class matter at the postoffice, Cleveland, O., under the act of March 3, 1879. Subscription price U. S. one year, $4.00; two years, $6.00; single copy (current issues) 25c; Canada, one year, $6.60; two years, $11.20. Great Britain and other foreign countries, one year £2

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

EDITORIAL STAFF

E. L. SHANER, *Editor*
E. C. BARRINGER, *Managing Editor*
E. C. KREUTZBERG, *Engineering Editor*

ASSOCIATE EDITORS

A. J. HAIN — E. F. ROSS
G. H. MANLOVE — J. D. KNOX
A. H. ALLEN

New York — B. K. PRICE—L. E. BROWNE
Pittsburgh — E. A. FRANCE JR.
Chicago — W. G. GUDE
Washington — L. M. LAMM
London — VINCENT DELPORT

Published by
PENTON PUBLISHING CO.
PENTON BUILDING
CLEVELAND, O.

JOHN A. PENTON . *Chairman of Board*
C. J. STARK . *President and Treasurer*
J. D. PEASE . *Executive Vice President*
F. V. COLE . *Vice President and Secretary*
GEORGE O. HAYS . . *Vice President*
E. L. SHANER . . . *Vice President*

BUSINESS STAFF

GEORGE O. HAYS, *Business Manager*
JOHN HENRY, *Advertising Manager*
R. T. MASON, *Circulation Manager*

New York — E. W. KREUTZBERG, J. F. AHRENS, J. W. ZUBER
Pittsburgh — S. H. JASPER
Chicago — L. C. PELOTT
Cleveland — R. C. JAENKE

Contents . . October 7, 1935

Volume 97 ♦ Number 15

AS THE EDITOR VIEWS THE NEWS 13

Spirit of Recovery Pervades Metal Congress and Show 14
W. A. Irvin Sees New Vistas Open to Steel 17
Carnegie-Illinois Has Seven Vice Presidents 18
A. N. Lindberg New Head of Metal Treaters 18
Steel May React Slowly, Ores Quickly to War 19
Cleveland Gets Republic Steel Corp. Offices 19
Pig Iron Rate Highest in 14 Months 20
Mirrors of Motordom 21
Windows of Washington 23
Why Steel for Building? 14 Reasons 24
Industrial Men in the Day's News 25
Obituaries 26
Government Undecided if Steel Is Contraband 87

Production ..... 87 — Labor 88
Meetings ..... 88 — New Capacity 89

EDITORIAL—Merchandising Should Match Technical Progress 27

THE BUSINESS TREND 28

ENGINEERING DEVELOPMENTS:

Molded Plastics ..... 30 — Deoxidizer for Foundries 33
Screw Machine Market ..... 32 — Humidified Buffs 33
Toolroom Wheels ..... 32 — All-Welded Tankship 34
Methods and Materials ..... 33 — Air-Acetylene Process 35
Reproducing Tracings ..... 33 — Robert E. Kinkead 36
Resistance Alloy ..... 33 — Power Drives 37

NATIONAL METAL SHOW 38

A. S. M. Meeting ..... 40 — Wire Association Meeting 42
A. W. S. Meeting ..... 41 — A. I. M. M. E. Meeting 44

Forum on Modernization ..... 45 — Open-Hearth Design—XIX .. 53
A. I. S. E. E. Meeting 49
Progress in Steelmaking ..... 52 — New Equipment 62

MARKET REPORTS AND PRICES 65-88
CONSTRUCTION AND ENTERPRISE 89
ADVERTISERS' INDEX 108

BRANCH OFFICES:

New York . . . . . **220 Broadway**
Chicago . . . . **Peoples Gas Building**
Pittsburgh . . . **1650 Koppers Building**
San Francisco . . . . **2413 Milvia St.**
Berkeley, Calif., Tel. Berkeley 7354W
Washington . . . **National Press Building**
Cincinnati . . . **418-420 Sinton Hotel**
London . . . . . **Caxton House**
Westminster, S. W. 1
Berlin . . **Berlin, N. W. 40, Roonstrasse 10**

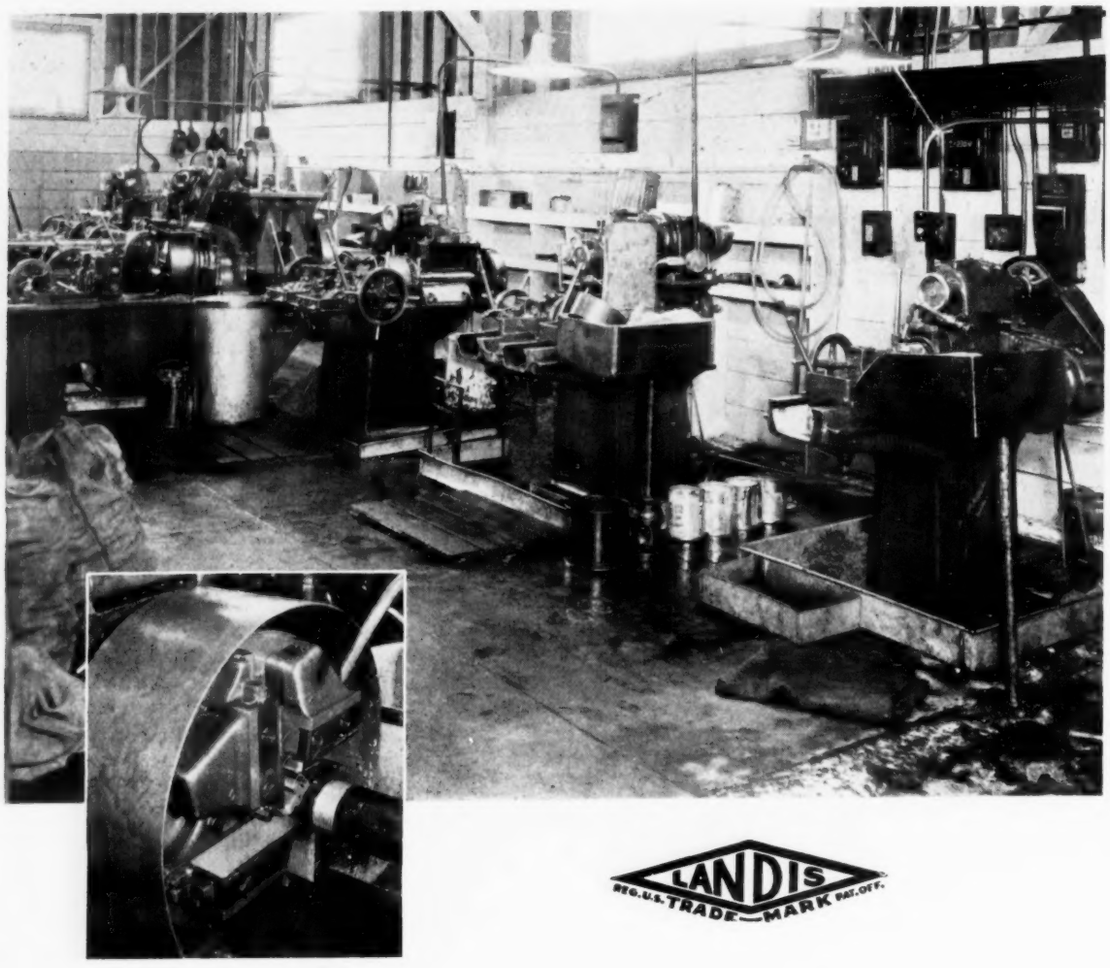
Member Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association.

Published every Monday. Subscription in the United States, Cuba and Mexico, one year $4, two years $6; in Canada, one year $6.60, two years $11.20; in Great Britain and European countries, one year £2.

Entered as second class matter at postoffice at Cleveland under the Act of March 3, 1879.

Copyright 1935 by Penton Publishing Co.

The LANDIS Equipped Nipple Shop Can Meet Competition



LANDIS
REG. U.S. TRADE—MARK PAT. OFF.

FROM Coast to Coast, LANDIS Machines are preferred by Nipple Manufacturers.

—BECAUSE fast threading speeds insure high production.

. . . they are simple and easy to operate.

. . . reaming and threading operations are performed simultaneously.

. . . tool costs are low.

. . . machines give dependable and uninterruped service.

THAT is why the Pacific Nipple Co. of San Francisco, Calif., installs these LANDIS Pipe and Nipple Threading Machines.

LANDIS MACHINE COMPANY, INC.

WAYNESBORO, PA.

As the Editor Views the News

WHEN the tom-toms of Ethiopia last week summoned native warriors to the defense of their country against Mussolini's invaders, the sentinels of industry throughout the world were forced to consider war in Africa as an actuality, rather than as a long awaited possibility. Consensus of opinion seems to be that as long as the conflict remains localized, its effect here will be slight. The first reverberations to be felt by American industry (p. 19) probably will be increases in the prices of certain foreign ores and other imports which pass through the Mediterranean. Purchasing agents should watch the situation closely.

• • •

Automobile output has passed the low point of the changeover period and last week totaled almost 25,000 cars. Motor car builders are looking for a brisk fall demand, and they base their optimism upon the fact that the Baer-Louis fight and the Tigers-Cubs world series games (p. 22) attracted crowds of predepression dimensions. They figure that the revival of interest in sports reflects a greater potential market for automobiles. This is important to the metalworking industry because the forthcoming demand for cars will go far in shaping the trend of steel output in the final quarter. Operations were up to 53½ per cent (p. 87) last week.

Sport Fans and Auto Demand

• • •

Chicago last week was the scene of four conventions of technical societies and a great metals exposition. Visitors who attended these events (p. 14) encountered an atmosphere of optimism and witnessed abundant evidence of marked improvements in materials and methods. This writer came away with the feeling that technological progress is in danger of outdistancing progress in merchandising (p. 27), and that industry faces the direct challenge of learning how to capitalize more effectively upon the remarkable results of its organized research. It was rather disheartening to go from the amphitheatre, where dozens of low alloy, high strength steels were displayed so attractively, to see Chicago's extensive elevated system and its thousands of cars of carbon steel and wood, in which the substitution of new steels would effect such savings in operation. Sometime, salesmanship will crack this and similar markets.

Research Sets Pace for Sales

• • •

Rivalry between materials usually is exciting, but, there is a possibility that manufacturers, steeped thoroughly in the technique of meeting stiff competition, sometimes overlook the fact that certain materials which compete on one front, supplement or complement each other in other markets. This seems to be the case with metals and plastics. Producers of metals who have looked askance at the mounting popularity of molded plastics will do well to investigate the manner (p. 30) in which these new materials may be used as adjuncts to metal assemblies. Rolled steel and castings often compete directly, yet in many cases they can be combined in an assembly to the great benefit of the customer. It does not always pay to fight a rival material.

Materials Not Always Rivals

• • •

A machine tool builder checked up on its machines in Ohio and found that 943 of them are more than 15 years old. The builder figures that 471 machines of the present model could do the work of the 943 old machines (p. 32), and do it better and more economically. If the builder could persuade the owners of the old equipment to substitute the new machines, his plant would be kept busy for a year and a half on this business alone. This problem is identical with that of selling new steels to car builders, referred to previously. Obstacles, such as difficulty in financing, lack of confidence, etc. are numerous, but eventually, sales effort will break down the resistance.

How Crack This Big Market?

E. L. Shaner

Spirit of Recovery Pervades Metal Congress and Show

WITH an unusually good attendance and a show which was the largest in five years, the seventeenth annual National Metal congress and exposition, held last week in Chicago, were reminiscent of their predecessors in predepression years. This was the fourth time in 17 years that the events were held in the leading city of the midwest.

Principal sponsor and originator of the congress and exposition was the American Society for Metals. Cooperating in the program of technical meetings were the American Welding society, the Iron and Steel and Institute of Metals divisions of the American Institute of Mining and Metallurgical Engineers, and the Wire association.

The exposition, held in the new International Amphitheatre, occupied 164,000 square feet of floor space and represented an increase of 50 per cent over the 1934 show in New York. It was only slightly smaller than the Philadelphia show of 1928.

Featuring the program of the American Society for Metals were 11 technical sessions, the annual business meeting, a 5-period educational course on heat treatment of steel, a 3-period lecture course on spectrographic analysis, and the annual banquet. Report of several technical sessions will be found on page 40.

Educational course activity in connection with the convention was initiated last year and proved so satisfactory that two courses were offered this year. The course on heat treatment of steel was conducted by Dr. M. A. Grossmann, director of research, Illinois Steel Co., Chicago. Registration totaled 340 and average attendance was over 250. The spectrographic analysis lectures open to anyone attending the congress and presented on the first three evenings of the week were directed by Dr. E. J. Martin, research division, General Motors Corp., Detroit. Attendance averaged 175.

Position Is Strengthened

Presenting formal reports at the annual business meeting, officers of the society showed that during the past year the organization has strengthened its position in membership and finances. Secretary W. H. Eisenman stated that on Oct. 1 membership totaled 6880, an increase of 1437, or 26.4 per cent, over the preceding year. This is an all-time high point. The society was established in 1920 with 1724 members, thus in 15 years it has increased its size by approximately 5000 members.

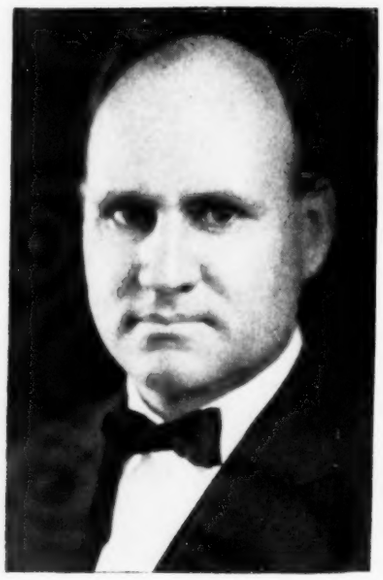
New officers, nominated last spring, were declared elected and assumed their positions at the close of the convention. R. S. Archer, chief metallurgist, Chicago division, Republic Steel Corp., Chicago, became the new president, succeeding B. F. Shepherd, manager, rock drill division, Ingersoll-Rand Co., Phillipsburg, N. J. E. C. Bain, assistant to vice president in charge of metallurgy and research, United States Steel Corp., New York, succeeds Mr. Archer as vice president. W. P. Woodside, vice president, Climax Molybdenum Co., Detroit, was elected treasurer for two years, succeeding Emil Gathmann, president, Gathmann Engineering Co., Baltimore.

Two new trustees, elected for 2

R. S. Archer
Newly elected president of the American Society for Metals

T. D. Yensen
Awarded the Henry Marion Howe gold medal of the American Society for Metals jointly with N. A. Ziegler

N. A. Ziegler
Awarded the Henry Marion Howe gold medal of the American Society for Metals jointly with T. D. Yensen



Zay Jeffries
Awarded the Albert Sauveur Achievement medal of the American Society for Metals

years, are R. L. Kenyon, supervising research engineer, American Rolling Mill Co., Middletown, O.; and S. C. Spalding, metallurgist, American Brass Co., Waterbury, Conn.

The board for the coming year will comprise the new officers and trustees and the following: Trustee Walter Mathesius, manager of production, Chicago district, Carnegie-Illinois Steel Co., Chicago; Trustee G. B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.; Past President B. F. Shepherd; and secretary W. H. Eisenman, Cleveland.

President Shepherd presented the R. M. Bird bell and gavel, awarded annually to the chapter which has shown greatest progress and has been of most service to the national society, to the Chicago chapter, which

C. A. McCune
Awarded the Samuel Wylie Miller medal of the American Welding Society

during the year had increased its membership from 480 to 646.

At the close of the annual meeting, H. W. McQuaid, metallurgist, Republic Steel Corp., Massillon, O., presented the 1935 Campbell Memorial lecture, "A Discussion of the Importance of the Aluminum Addition in Modern Commercial Steels." Dr. Bradley Stoughton, professor of metallurgy, Lehigh university, Bethlehem, Pa., introduced Mr. McQuaid.

The principal speaker at the banquet on Thursday evening, Oct. 3, was W. A. Irvin, president, United States Steel Corp., New York (See page 17). Special guests were B. F. Fairless, president, I. Lamont Hughes, executive vice president, and G. Cook Kimball, vice president, Carnegie-Illinois Steel Co.; A. G. McAllister, president, International Harvester Co., Chicago; and R. H. Cabell, president, Armour & Co., Chicago.

The banquet, served to 800 members and guests, was the largest in the history of the society. Seated at the banquet table were two founder members of the society—W. P. Woodside, vice president, Climax Molybdenum Co., Detroit; and T. E. Barker, president, Accurate Steel Treating Co., Chicago.

Presentation of the Albert Sauveur Achievement award, established last year in honor of the widely-known metallurgist to recognize outstanding contributions to metallurgical knowledge, was made to Dr. Zay Jeffries, consulting metallurgist, Cleveland. The presentation was made by Dr. A. E. White, director of engineering research, University of Michigan, Ann Arbor Mich.

The Henry Marion Howe gold medal, for the best paper published in *Transactions* during the past year, was awarded to T. D. Yensen, manager, magnetic division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and N. A. Ziegler, sales research engineer, West Penn Electric Co., Pittsburgh.

The Past President's medal was tendered to W. H. Phillips, vice president, Molybdenum Corp. of America, Pittsburgh, president in 1934.

Welding Aided by Research Work

FURTHER progress in the welding art, not only in the perfection of present practice but in its application as well, was evidenced in the various reports presented at the fifteenth fall meeting of the American Welding society, at the Palmer house, Chicago, Sept. 30-Oct. 1.

Two sessions were devoted entirely to discussions of the work being carried on under the sponsorship of the fundamental research committee. This activity consists largely of experiments being conducted at various colleges and universities.

Indicative of both increased interest in welding and improved industrial conditions was the registration of around 600 for the meeting, a substantial gain over the attendance of the past several years.

Highlight of the opening session was the awarding of the Samuel Wylie Miller memorial medal to Charles A. McCune, director and secretary, Magnaflux Corp., New York, in recognition of "his pioneering in the development and application of fusion welding." (For Mr. McCune's biographical sketch see STEEL, Sept. 30.) This medal is named for its originator, the late S. W. Miller, Union Carbide & Carbon Research Laboratories Inc.

President J. J. Crowe of the society announced the following members of the society's 1936 nominating committee: E. A. Doyle, Union Carbide & Carbon Corp.; F. M. Farmer, Electrical Testing Laboratories; H. C. Boardman, Chicago Bridge & Iron Works; Everett Chapman, Lukenweld Inc.; A. F. Davis, Lincoln Electric Co.; I. B. Hexter, *Industry and Welding;* Charles Schenck, Bethlehem Shipbuilding Corp.

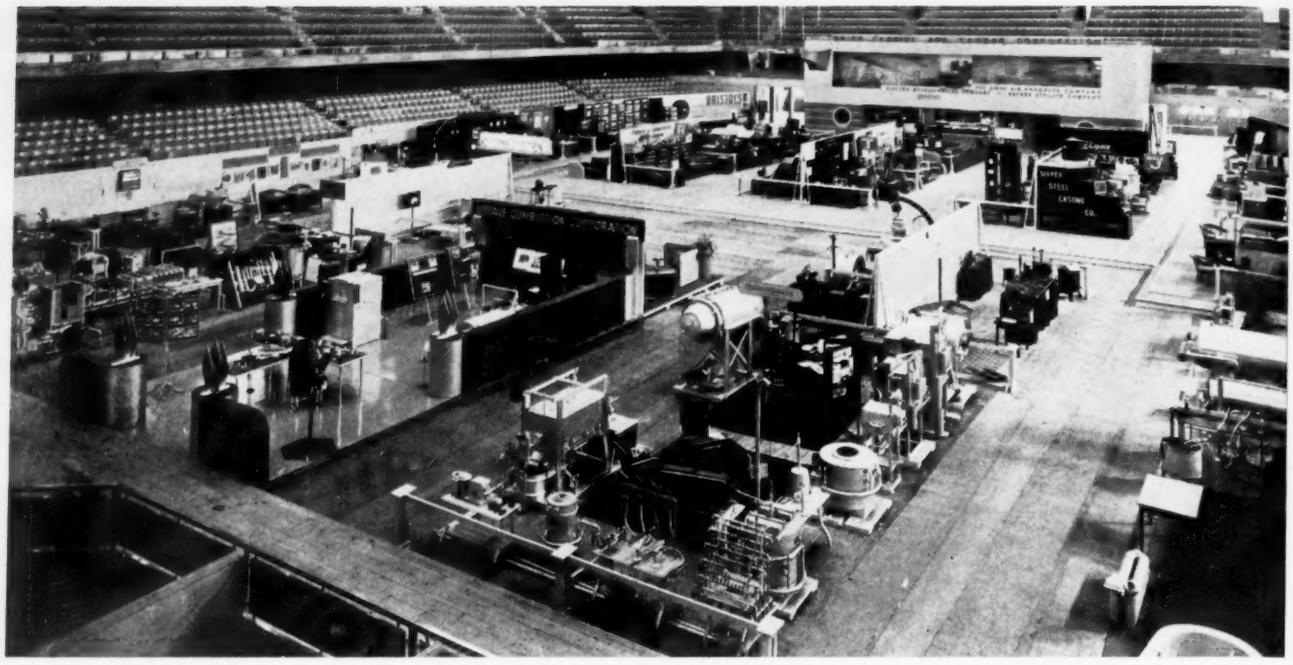
Wire Association Awards Medal

REGISTRATION of members and guests attending this year's convention of the Wire association included a larger number of company representatives of the type of executives than at any time since the association was formed.

Benjamin Lewis McCarthy
Awarded the Wire association medal for the most meritorious paper on wire manufacture or fabrication during the year

At the annual meeting of the Wire association held Sept. 30, all the officers were re-elected, namely, John Mordica, superintendent, rod and wire works, Bethlehem Steel Co., Sparrows Point, Md., as president; L. D. Granger, assistant to vice president, Wickwire-Spencer Steel Co., New York, and E. W. Clark, managing engineer, wire department, General Electric Co., Schenectady, N. Y., as vice presidents; and R. E. Brown, publisher, New York, as secretary.

E. P. Kastien, Keystone Steel & Wire Co., Peoria, Ill., and J. C. Ward Jr., assistant to president, United Aircraft Corp., East Hartford, Conn., retired as directors.



General view of the gas furnace section of the Metal Show, in the main arena of the International Amphitheatre, Chicago. Two large wings on either side of this space contained other exhibits

New directors elected include J. K. Boll, manager, wire sales division, Wheeling Steel Corp., Wheeling, W. Va., and R. S. Simmons, chief metallurgist, Keystone Steel & Wire Co., Peoria, Ill.

Three directors were re-elected. These are C. S. Barningham, sales manager New England Butt Co., Providence, R. I.; E. W. Clark, mechanical engineer, wire and cable division, General Electric Co., Schenectady, N. Y.; and John Mordica, Bethlehem Steel Co., Sparrows Point, Md.

B. L. McCarthy, in charge of chemical and metallurgical laboratories, Wickwire-Spencer Steel Co., Buffalo, N. Y., was awarded the Wire association medal "for the most meritorious paper on the art of wire manufacture or fabrication during the year." His paper on "Grain Size and Its Influence on the Manufacture of Steel Wire" was presented at the Wednesday morning session.

Honorable awards were presented to R. A. Schatzel, superintendent, general research laboratories, General Cable Corp., Rome, N. Y., and L. D. Seymour, metallurgist, rod and wire department, Youngstown Sheet & Tube Co., Campbell, O.

Engineers Discuss Making of Steel

LIVELY interest was exhibited by those attending the eight technical sessions sponsored by the Iron and Steel division and Institute of

(*Please turn to Page* 88)

National Metal Show Reflects Marked Advance in Materials and Methods

INTERNATIONAL Amphitheater, scene of the seventeenth National Metal exposition, was built since the recent fire which nearly wiped out the Chicago stockyards. The building comprises a central arena and a large wing on either side. A balcony with seats extends along three sides of the arena, which during the Metal Show was termed the industrial gas section. This section has an earth floor, and is ordinarily the scene of cattle judging and exhibition.

The historic Chicago Union Stockyards are nearby, as are other famous landmarks of this district—the Stockyards Inn, Saddle and Sirloin club, Boys and Girls club, and Livestock National Bank.

♦ ♦ ♦

The Metal exposition attracted several visitors from overseas. Among those registering on the opening day were: A. P. Newall, chairman, A. P. Newall Co., Glasgow, Scotland; Alfred Rapp, sales engineer, A. B. Kanthal, Hallstahammar, Sweden; John K. Zubco, Bewinow, Poland; and Fritz Hurth, Carl Hurth Co., Munich, Germany.

♦ ♦ ♦

The new International Amphitheater in which the 1935 National Metal exposition was held claims the distinction of having the longest unsupported steel roof trusses of any structure in the world. Of interest also is the use of steel in other parts of the building. Eighty tons of Toncan iron was used for all ventilating ducts and 10 tons of Enduro stainless steel was used for trim and panels around the arena. This material was made and supplied by Republic Steel Corp., Youngstown, O.

♦ ♦ ♦

Design and equipment of display booths registered another step ahead since the last Metal Show. In addition to ingenious use of lights, colors, bright metal trim, modernistic furniture and other artistic touches, three booths were covered over by specially built roofs which fit into the design schemes of the booths. The three in which this treatment was adopted were those of Republic Steel Corp., United States Steel Corp. and subsidiaries, and the Union Carbide & Carbon Corp. and affiliated companies.

♦ ♦ ♦

Boulder dam and power plant were depicted by a metallic model displayed at the booth of the American Steel & Wire Co.

♦ ♦ ♦

Among the heaviest machinery exhibited was a new high speed tube and bar straightener. This machine, built by Sutton Engineering Co., Pittsburgh, has driving rolls which are axially adjustable. The company also exhibit-

(*Please turn to Page* 38)

New Vistas Open to Steel, Assuring Continued Growth

By William A. Irvin

Excerpts from an address by the president of the United States Steel Corp., New York, before the annual dinner of the American Society for Metals, in connection with the seventeenth annual national metal congress and exposition, in Chicago Oct. 3

WE ARE led to believe that if the average steel ingot production for the ten-year period ending with 1929, amounting to 41,500,000 gross tons per annum, indicates even approximately the position of the steel-producing industry with respect to the demands of the trade, there should soon be considerable room for increased production over that of our present rate, in view of the low average applying to the past five years.

Certainly a fair proportion of this average represents deferred maintenance and replacement, therefore it should enter the picture once again as an addendum to whatever normal demand is developed.

To enumerate even the most important applications of steel would be the equivalent of levying a nuisance tax upon your forbearance. The elimination of this versatile metal, from certain sectors, is too remote for immediate discussion.

Steel Entering New Fields

On the other hand, there may be an interest in reviewing a few of the fields in which the enlarged use of steel, or its adjustment to new conditions, is receiving much attention.

Streamlined passenger trains, constructed of alloy steel, are relatively novel, but are finding a logical place in transportation.

Data obtained thus far indicate the amount of steel used in constructing these trains is not just so much taken for the regular tonnage requirements, but that travel is actually being increased.

A market for various grades of high tensile alloy steels seem to be in the making as a result of this development. Similar steps are being taken with respect to street cars, trucks, and buses.

In an important way, attention is now being directed to the more extensive use of steel in construction of the superstructure of ships. Reduction of fire hazard is a prime consideration here, although appearance and reduction in weight are also attractive possibilities.

Office partitions of steel are not a new commodity, but furnishing of complete interiors in a manner to combine utility with artistc treatment is a more recent outgrowth of the original idea.

A little farther along this line is the steel house, or more properly,

William A. Irvin

the residence in which steel is used wherever proper advantages can be taken of its particular properties.

The potential market for steel in this field is one of most attractive proportions.

An interesting new application of steel is the container recently developed for beverages. Without standing upon tradition and custom, the public has readily accepted this tin container because of the superior service it performs, and once again the doors are opened for an enlarged consumption of steel in the form of tin plate.

Examples might be multiplied, but enough has been said to indicate that in the development of new trade requirements, and in the constant shifting of the old, there is an important place for steel. It is our duty and responsibility to keep it so.

The organic strength of the technical side of the steel industry, in both its producing and consuming branches, is well illustrated by the advances which have been made during recent years. The following examples will assist in elaborating upon this point:

1. In many quarters new and improved alloy steels have appeared, including the so-called high tensile group and certain members of the stainless family.

2. Controlled grain size, dependent upon the careful regulation of many factors involved in making the steel, is now a commercially established feature, affecting numerous products of the industry.

3. The interaction of slag and metal in the open-hearth furnace is better understood, thanks to the large amount of research work which has been done on this subject. Equilibrium, a word heretofore confined to laboratory quarters, is now frequently heard on the charging floor.

4. The all-important deoxidation process has been further investigated and rationalized as a necessary complement to the other features mentioned.

5. Non-aging steel has become a factor in meeting certain trade requirements.

6. Improvements in methods of heat treatment and physical testing, the results of organized research, have been so numerous and important that only a group of experts, such as those now present, could possibly comprehend their full significance.

7. Implements for the closer and more effective control of processes have been devised both within the industry and by its suppliers, so that in this direction also the happy union between art and science is working for the betterment of all.

Mechanical Equipment Keeps Pace

In the adaptation of improved mechanical equipment, the mention of a relatively few examples will serve to illustrate the trend of developments.

Hot strip mills, along with cold reduction mills, probably stand at the head of the list, at least in point of size and attraction of widespread popular interest.

Die rolling, electric welding, improved seamless tube mills, and furnaces for heating steel in controlled atmospheres are performing new services in their respective fields.

In all of these examples, which undoubtedly are matched by their counterparts in other lines of the metals industry, we see tokens of continual advancement, and the promise of progressively modern products to meet modern requirements.

Evolution and development must continue, if the success of tomorrow is to be greater than the achievement of today.

Carnegie-Illinois Recasts Personnel

BENJAMIN F. FAIRLESS launched upon his career as president of the Carnegie-Illinois Steel Corp. last Tuesday by declaring that the outlook for the steel industry is the brightest in four years. He also explained that most expansion of his company will be in flat rolled products.

On Tuesday, the day Carnegie-Illinois formally began to function, I. Lamont Hughes, former president of the Carnegie Steel Co., was named executive vice president.

Other vice presidencies also went to former Carnegie officials. C. V. McKaig was appointed vice president and general manager of sales, and J. E. Lose, vice president in charge of operations for the Carnegie-Illinois Steel Corp. Messrs. Fairless, Hughes, McKaig, and Lose will maintain offices both in Pittsburgh and Chicago.

Create 7 Vice Presidents

Four other vice presidents were also appointed. G. Cook Kimball, whom it was recently announced would be head of the Illinois Steel division succeeding G. G. Thorp, is designated as "vice president and chief executive of the Chicago district."

To William I. Howland Jr., who had been vice president and general manager of sales of Illinois Steel Co., went an appointment as "vice president in charge of western sales."

L. H. Burnett, formerly vice president of Carnegie, is to be a vice president of Carnegie-Illinois with offices in Pittsburgh, and Carroll Burton, formerly president of Lorain Steel Co., Johnstown, Pa., vice president in charge of the Lorain division.

Thus, the newly formed Carnegie-Illinois Steel Corp. starts out with seven vice presidents. As was previously announced (STEEL, Sept. 30, page 10) J. W. Hamilton was elected secretary, William Donald, auditor, and H. E. Jeffries, treasurer.

Sales Changes Come Next

Other appointments made last week by Mr. Lose, vice president in charge of operations, effective Oct. 1., were:

William C. Oberg to be manager of operations, Pittsburgh district.

Walter Mathesius to be manager of operations, Chicago district.

R. B. Porter to be manager of operations, Lorain division.

Sydney Dillon to be chief engineer.

C. F. W. Rys to be chief metallurgical engineer.

John A. Hagan to be chief industrial engineer.

Frank E. Kling to be chief engineer, Pittsburgh district.

Charles B. Getsinger to be director of fuel and power.

Edward T. Barron to be manager, metallurgical department, Pittsburgh district.

John Brunner to be manager, metallurgical department, Chicago district.

Carnegie-Illinois expects to announce within the next month personnel changes affecting the sales department.

The steelmaking capacity of the new company is 20,460,900 gross tons, or 29 per cent of the country's total capacity. While the products of Carnegie and Illinois have in general been similar, the new organization will be able to offer customers a much broader and more complete range of steel products.

At this juncture, United States Steel Corp. executives have confirmed the unification of Lorain Steel Co., which manufactures special track work and accessories, girder rails, castings, mine and industrial cars, with the Carnegie-Illinois setup.

The Illinois division of the company will continue to maintain administrative, sales, operating, and financial headquarters at 208 South LaSalle street, Chicago, and purchasing departments will be maintained in both the Pittsburgh and Chicago districts; this latter dispelling rumors that purchasing, too, might be concentrated at Pittsburgh.

A Wizard in the House of Magic

Henry Ford and some officials of his company visited Schenectady, N. Y., recently to see his new 110,000-*kilowatt turbine on test at the General Electric Co. plant before shipment to the River Rouge power generating station. On a platform atop the turbine—the first large unit to operate at* 1200 *pounds pressure and* 900 *degrees Fahr.—are shown, left to right, A. R. Smith, managing engineer of the G-E turbine engineering department; Henry Ford; Gerard Swope, president of General Electric; and Edsel Ford*

Lindberg New Head of Metal Treaters

A. N. LINDBERG, president, Lindberg Steel Treating Co., Chicago, was elected president of the Metal Treating Institute Inc. at the organization's annual meeting at the Palmer House, Chicago, Oct. 2, during the National Metal congress. Mr. Lindberg, who has been vice president, succeeds Ralph J. Hoensheid, Commercial Steel Treating Corp., Detroit.

A. D. Bach, president, New England Metallurgical Corp., Boston, becomes the new vice president, succeeding Mr. Lindberg. The new secretary is A. S. Eves, vice president, Perfection Tool & Metal Heat Treating Co., Chicago; he replaces Arthur F. Nuesse, secretary, Wesley Steel Treating Co., Milwaukee, who has served in the secretaryship for the past two years. O. T. Muehlemeyer, president, O. T. Muehlemeyer, Rockford, Ill., succeeds W. S. Bidle, president W. S. Bidle Co., Cleveland, to the office of treasurer.

Trustees Are Chosen

The following trustees were reelected: C. G. Heilman president, Commonwealth Industries Inc., Detroit; Theodore Wiedemann, president, Wiedemann Machinery Co., Philadelphia, and A. M. Cox, president, Pittsburgh Commercial Heat Treating Co., Pittsburgh.

The following four new trustees were named: Kenneth Stumpf, in charge of heat treating department, Stanley P. Rockwell Co., Hartford, Conn.; T. E. Barker, president, Accurate Steel Treating Co., Chicago; O. T. Muehlemeyer, the new treasurer; and R. J. Thurner, president, Thurner Heat Treating Co., Milwaukee.

The Institute was organized two years ago to represent the commercial heat treating industry in code

administration; since codes were abolished it has carried on as a trade association. Membership comprises nearly 40 companies.

Matters discussed at the annual meeting were plans for the coming year, including advertising, publicity, and methods for conveying to the membership information and facts pertaining to metal treating, such as new methods and processes.

Cleveland Gets Republic Offices

REPUBLIC STEEL CORP., which recently acquired the Corrigan, McKinney Steel Co. and its subsidiaries, Newton Steel Co. and N. & G. Taylor Co., and also the Truscon Steel Co., Youngstown, O., will consolidate its general offices in Cleveland about Jan. 1.

This will move to Cleveland the following Republic executives and their departments: R. J. Wysor, executive vice president and general manager; N. J. Clarke, vice president in charge of sales; C. M. White, vice president in charge of operations; W. W. Hancock, secretary and treasurer, and P. F. Boyer, comptroller.

Already in Cleveland are T. M. Girdler, chairman and president; Myron A. Wick, vice president; and Donald B. Gillies, former Corrigan-McKinney president and now a Republic vice president.

At least some of the departments to be moved from Youngstown to Cleveland will be housed in the Corrigan-McKinney office building at 3100 East Forty-fifth street.

In addition to personnel changes announced in STEEL for Sept. 30, p. 9, Republic last week appointed Frank F. Chiles, former manager of sales of the bar division of Corrigan-McKinney, assistant manager of sales of the bar division of Republic. He will assist W. F. Vosmer in supervising sales of all carbon semifinished steel bars, shapes and plates produced by Republic.

Appointment of Carl A. Ilgenfritz as manager of purchases and raw materials for Republic also was announced last week (see p. 25).

Henry T. Harrison, for 30 years with Corrigan-McKinney, has resigned as vice president in charge of operations. For 20 years with that company, he was closely associated with Price McKinney and both the senior and junior Corrigans in the operation of their blast furnaces and construction of the steelworks in Cleveland.

This week Production news is on page 87. Labor and Meetings 88, and New Capacity 89.

Steel May React Slowly, Ores Quickly, to War Situation

NEW YORK

THE grave turn in the Italo-Ethiopian situation last week, while in no sense a surprise, caused steel producers to take even closer appraisal of the possible effects of hostilities in the Mediterranean area.

Generally speaking, the belief is that just as long as hostilities are confined to Italy and Ethiopia, the effects on the American steel industry are not going to be sweeping, but that if Great Britain or any of the other powers were to become embroiled a much more complicated picture would be presented.

Judging from Geneva's cabled interpretations of Premier Mussolini's radio address last week, Italy may accept the sanctions which the League of Nations plans to impose as inevitable and not necessarily a warlike gesture on the part of the member nations; and as for Great Britain, she, for the time being at least, appears to show no disposition to go beyond the non-military sanctions proposed.

Hence, steel business in this country may go on for some time, possibly indefinitely, without reflecting any broad important change as a result of the war in Africa.

Further, the question of government embargoes on steel products and such other commodities as scrap is a matter that may not be answered for some time, notwithstanding the close consideration being given to the problem at this time in Washington.

The belief also is that Italy, which by this time has undoubtedly accumulated raw materials to last for some time, will not interfere with neutral shipments, except as a last resort, if then.

Of all the aspects considered by the American steel producers, the question of foreign ores appears the most likely to be affected first. At the moment, foreign ore prices are unchanged, but fast increasing cargo insurance rates, combined with the heavy demand noted on the other side for some time, make higher prices for next year's contracts appear almost inevitable and this should be reflected in quoted prices shortly.

As a matter of fact, both parties to contract negotiations at this time are proceeding cautiously with an eye to developments abroad, but that some heavy tonnages are likely to be consummated appears certain, for while some consumers are fairly well protected, others are not.

Much of this ore normally passes

(*Please turn to Page* 86)

Are You Here?

Great interest was aroused by the display of the working model of the Youngstown Sheet & Tube Co.'s continuous wide strip mill at the recent convention of the Association of Iron and Steel Electrical Engineers in Pittsburgh. Here is a group of delegates and visitors inspecting it. Photo courtesy of Pittsburgh Post-Gazette

Iron Rate Is Highest in 14 Months; 6 More Stacks Active

EXPANDING blast furnace operations developed a small increase in the average daily output of coke pig iron in the United States in September, lifting it to the highest daily average since June, 1934. Active blast furnaces increased from 98 on the last day of August to 104 on Sept. 30.

Total production of 1,770,259 gross tons in September brought the figures for the first nine months of 1935 up to 14,880,315 gross tons, an increase of 1,839,901 tons or 14 per cent over the 13,040,414 tons produced in the corresponding period of 1934. Production in the 9-month period of 1933 was 9,587,291 tons. Total production of iron in September was a gain of 10,477 tons over the 1,759,782 tons of the preceding month, or 6 per cent. Output in July was 1,520,340 tons; in September, 1934, it was 899,075 tons.

AVERAGE DAILY PRODUCTION

Gross Tons

	1935	1934	1933	1932
Jan.	47,692	39,537	18,348	31,336
Feb.	57,675	45,385	19,752	33,122
Mar.	57,120	52,438	17,484	31,194
Apr.	55,719	57,873	20,786	28,524
May	55,986	66,370	28,784	25,282
June	51,949	64,563	42,165	20,867
July	49,043	39,630	58,108	18,394
Aug.	56,767	34,199	59,137	17,035
Sept.	59,009	29,969	50,264	19,788
Oct.		30,689	43,824	20,795
Nov.		31,930	36,124	20,858
Dec.		33,161	38,456	17,650
Ave.	54,506	43,774	36,223	23,699

Average daily production in September increased to 59,009 gross tons, which, compared with the 56,767-ton rate of August, was an increase of 2242 tons per day. The daily rate in July was 49,043 tons, while in September, one year ago, the daily rate was 29,969 tons. As was stated above, the average daily output for September is the highest since June, 1934, with 64,563 tons.

Relating production to capacity, the operating rate for September was 42.5 per cent as compared with 40.7 per cent in August, 35.2 per cent in July, 37.2 per cent in June, and 40.2 per cent in May. The operating rate for September one year ago was 21.5 per cent, and in September, 1933, 36.4 per cent.

Active blast furnaces on Sept. 30 totaled 104, this comparing with 98 on Aug. 31, 92 on July 31, and 91 on June 30. On Sept. 30, 1934, only 61 stacks were in blast.

During September nine furnaces resumed operation and three were blown out or banked. Of this number, five nonmerchant or steelworks were blown in and three were taken out; of the merchant class, four were blown in and none went out.

MONTHLY IRON PRODUCTION

Gross Tons

	1935	1934	1933
Jan.	1,478,443	1,225,643	568,785
Feb.	1,614,905	1,270,792	553,067
Mar.	1,770,990	1,625,588	542,013
Apr.	1,671,556	1,736,217	623,606
May	1,735,577	2,057,471	892,326
June	1,558,463	1,936,897	1,264,953
July	1,520,340	1,228,544	1,801,345
Aug.	1,759,782	1,060,187	1,833,265
Sept.	1,770,259	899,075	1,507,931
Tot. 9 mo.	14,880,315	13,040,414	9,587,291
Oct.		951,353	1,358,540
Nov.		957,906	1,083,740
Dec.		1,028,006	1,192,136
Total		15,977,679	13,221,707

Furnaces blown in during September were: In Ohio: Jisco, Jackson Iron & Steel Co.; Globe, Globe Iron Co.; Mingo No. 4, Carnegie Steel Co. In Pennsylvania: Perry, Interlake Iron Corp.; Edgar Thomson G, Carnegie Steel Co.; Brooke, E. & G. Brooke Iron Co. In New York: Lackawanna A, Bethlehem Steel Co. In Illinois: South Works Old E, Illinois Steel Co. In West Virginia: Riverside, Wheeling Steel Corp.

Stacks blowing out or banking in September were : In Ohio: Youngstown No. 5, Republic Steel Corp. In New York: Buffalo No. 1, Republic Steel Corp. In Kentucky: Norton, American Rolling Mill Co.

SEPTEMBER IRON PRODUCTION

	No. in blast last day of Sept.	No. in blast last day of Aug.	Total tonnage Merchant	Total tonnage Nonmerchant
Ohio	26	24	85,677	371,898
Penna.	34	31	57,971*	442,002*
Alabama	6	6	51,687	39,618
Illinois	8	7	42,602	125,353
New York	8	8	56,233	53,514
Colorado	1	1		
Indiana	8	8	5,731*	275,215
Maryland	3	3		
Virginia	1	1		
Kentucky	1	2		
Mass.	0	0		
Tennessee	0	0		
Utah	1	1	8,535	154,223
West Va.	3	2		
Michigan	4	4		
Minnesota	0	0		
Missouri	0	0		
Total	104	98	308,436*	1,461,823*

*Includes ferro and spiegeleisen.

RATE OF OPERATION

(Relation of Production to Capacity)

	1935[1]	1934[2]	1933[3]	1932[4]
Jan.	34.2	28.3	13.3	22.1
Feb.	41.4	32.5	14.3	23.4
Mar.	41.0	37.5	12.7	22.0
Apr.	40.0	41.4	15.1	20.2
May	40.2	47.5	20.9	17.9
June	37.2	46.3	30.6	14.7
July	35.2	28.4	42.4	13.0
Aug.	40.7	24.5	42.8	12.0
Sept.	42.5	21.5	36.4	14.0
Oct.		22.1	31.8	14.7
Nov.		22.8	26.2	14.7
Dec.		23.7	27.9	12.5

[1]Based on capacity of 50,845,741 gross tons, Dec. 31, 1934; [2]capacity of 50,975,561 tons, Dec. 31, 1933; [3]capacity of 50,313,975 tons, Dec. 31, 1932; [4]capacity of 51,598,175 tons, Dec. 31, 1931. Capacities by American Iron and Steel institute.

Taylor, at Launching, Calls War Enemy of Industry

Myron C. Taylor, chairman, United States Steel Corp., said Sept. 28 at the launching of the destroyer FLUSSER from the Federal Shipbuilding & Dry Dock Co., Kearny, N. J.:

"Men of industry consider war a great destroyer and an unsettler of their affairs, and all would welcome its abolition. The last war in its ultimate effect nearly destroyed all industry. Industry comes on the scene only after statesmanship and diplomacy have failed, or when government itself fears its inadequacy or failure."

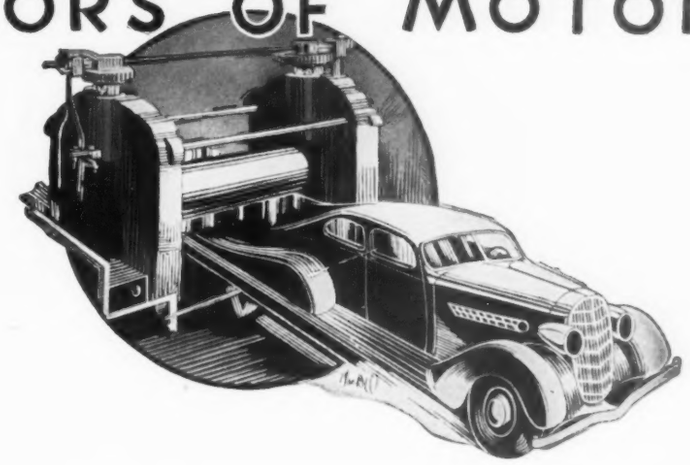
The FLUSSER is the first naval vessel to be built by the Federal company, a subsidiary of the Steel corporation. Mr. Taylor observed that the FLUSSER "will probably return to her builders no profit, but she will be worthy of the United States navy and of her builders".

Business Loans Faulty, Says Editors' Committee

A committee representing the 130 member publications of the Associated Business Papers Inc. and the National Conference of Business Paper Editors has reported that the machinery created by the government to finance business, particularly small business, has not functioned altogether satisfactorily.

Of $580,000,000 authorized for bolstering the credit of industry, only about $155,000,000 of loans have been approved in the elapsed year. Some of the causes for this slackness are reluctance to borrow, fear of possible government interference and management, fear of red tape, and hesitancy to expand operations in the face of an uncertain future.

MIRRORS OF MOTORDOM



DETROIT

HUDSON has been completely restyled for 1936, with wheelbases lengthened 3 to 10 inches and bodies correspondingly longer and also wider.

Most striking, perhaps, is the new radiator grille. The flow lines of the center portion, which is die cast, rise from the bottom to form a large V. Flanking the die-cast section on each side is a lattice-work stamping of steel, which is the same color as the body and rounds into the hood. Surmounting the grille is an ornament simulating an airplane, the wings being bright metal and the fuselage a ruby-red transparency.

The steel top is a one-piece stamping this year, peaked at the front to blend into the divided V-shape windshield. The rear slope and rear quarters have been smoothed out to give a sleeker appearance from the rear. As in 1935, the rear window is divided.

Hudson Triangle on Fenders

Louvers in the hood are two parellel series of vents, culminating in a dart effect at the front. This dart reverses the bullet-shape effect of the headlamps. Horns are exterior mounted. Fenders are more pronouncedly streamlined, the draw giving more trouble than the one-piece top. Running boards are flat.

The baggage and tire compartment at the rear is changed this year to permit the spare tire to lay flat, thus increasing space for baggage. The 6-cylinder series has only the word Hudson on the larger hubcaps, but the 8-cylinder series also carries the word eight.

The characteristic Hudson triangle is mounted on the front slope of both front fenders on the eight. The window ventilating system has been retained. Windshield wipers operate from the bottom of the shield.

Inside the new Hudsons a new note is struck in styling of instrument boards. From the V of the windshield the board comes back in a flat plane, curving in at the bottom. In the middle of the V and appearing flat to the driver is an elliptical instrument panel; in the center of the panel is a large airplane-type speedometer, at the right but within the panel is a temperature gage, at the left a gasoline gage, and below are the telltale lamps for oil pressure and charging.

The radio dial is in the curve of the instrument board. Incidentally, the radio antenna is stone, mounted underneath the car between the running boards.

Torque Arms on Front Axle

The "electric hand" gearshift, which has been mechanically improved, continues optional, and where specified the gearshift lever is removed. Further to increase the roominess of the front compartment, the emergency brake lever is mounted at the driver's left underneath the instrument board. The ratchet has been removed from the handle, and a mere flip of a finger releases the lever.

Hudson will stress five engineering innovations in 1936, and one apparently is the use of torque arms on the front axle. Extending from the outside of the side rail of the frame to the axle, these drop-forged arms or rods hold the front axle in alignment and release the front springs for the sole function of cushioning. As a result, shorter and softer semi-elliptic springs are used.

Hudson has gone to internal-expanding hydraulic brakes for 1936. The emergency brake is mechanical, operating on the rear wheels. The longer wheelbases require longer propeller shafts. Engine dimensions and tire sizes generally are unchanged from 1935.

The Terraplane line is expected to be somewhat similar in styling, although of course on a smaller scale than Hudson. The front end appearance will be identical, but the radiator grille will be entirely pressed steel. Terraplanes will be shown Nov. 2, the date of opening the New York show. Prices have not yet been announced for Hudson-Terraplane, but no marked change is expected.

The keynote of Hudson-Terraplane design for 1936, as laid down by Roy D. Chapin, president, and Stuart G. Baits, chief engineer, is safety. Four of the five innovations previously referred to relate to safety. Terraplane also will stress a surplusage of luxury and roominess over mere transportation.

Although the line will not be officially announced until Oct. 26, a sample Hudson was exhibited before the baseball-mad portion of Detroit last week at the Book-Cadillac hotel, which was the temporary lair of the Chicago Cubs and the focal point for fans.

Plymouth, which also will show its new line for the first time Oct. 26, last Thursday noon assembled its dealers in 34 leading cities to broadcast to them—and also, it hoped, to thousands of radio fans tuning in for the world series broadcast.

Plymouth Stresses Styling

It interlarded an hour of sparkling radio entertainment with teasers concerning the new models, and, not having any Russian business to speak of, tossed in the style plaudits of a grand duchess for good measure.

In Plymouth, too, the chief innovations are in styling, and the new models will be described as "the peak of perfection." Bodies are roomier and 4½ inches longer.

The radiator grille, of pressed steel, consists of vertical bright fins rising vertically and unbroken by any cross bars, as the 1935 grille was. The fins for about three inches both sides of center are enameled the same color as the body.

Headlamps are mounted on airplane-type struts, and when the bright beam is depressed for passing it is also deflected to the right side of the road. Fog caps are mounted

on the bulbs to increase visibility in thick weather.

Fenders are more streamlined, and a molded edge increases the effect of stiffness. This molding also extends around the running board. Hood louvers are two horizontal slots in the hood side decorated with three bright strips of steel.

Vertical lines in a contrasting color set off the instrument board. Instruments are mounted in one panel in the center. A toe board is built into the rear of the front seat. The rear quarter windows are hinged at the front.

Plymouth does well by steel with a heavier, redesigned frame, with side rails 5½ inches deep, but it starts the season with a soft top. However, Dodge and, it is understood, the other Chrysler lines, have a steel top. Chrysler is negotiating for the keller equipment required for the production of one-piece steel tops.

Front springs are shackled at the front ends, and at the rear of the left spring a kick shackle is used. A new type muffler is made without baffles. Pistons in the master cylinder of the brakes, which are labeled "100 per cent hydraulic," are now bronze; pistons on the wheels are duralumin.

Engine dimensions are generally unchanged, and the compression remains 6.7.

A feature of the interior is that the stitching on the seat upholstery is repeated on the doors.

New Cadillac Is Fast

Heretofore Ford and Hudson have been accepted as the speed kings of the automobile world, but Cadillac is hinting that its new small series, with a 121-inch wheelbase and a selling price about $2000, will easily do 100 miles per hour. The other Cadillac series will be on a 131-inch wheelbase chassis.

The chief change in the new LaSalle is the radiator grille. It will be practically as narrow as the present series, but the fins will loop out horizontally in a manner reminiscent of the rounded radiator of DeSoto before it went airflow.

Assembly lines were given the gun last week. Almost without exception, every automobile manufacturer in the Detroit area is now turning out new models, and every effort is being exerted to push production up as rapidly as possible.

The week ended Sept. 21, when only 12,600 jobs were assembled, thus stands as the low point of the changeover period. The week ended Sept. 28 saw the curve of production turn upward to 15,994 units. Last week the total was 24,770, and this week will see an even sharper rise.

Plymouth, first of the low-price field to swing into quantity production, expected to attain a daily rate of 1000 units by Tuesday of this week. With the opening of its new assembly plant at Evansville, Ind., the expansion of its Los Angeles plant from 150 cars daily to 250, and enlargements and rearrangements in Detroit, Plymouth will be able to top 10,000 cars weekly this year.

Its annual capacity, according to Plymouth, is now 500,000 units. In the first eight months of this year its actual output was 313,936 jobs. Plymouth is shooting at a mark of 40,000 units in October and 50,000 each in November and December.

Hudson-Terraplane, which plans to have its dealers amply stocked by the debut date of Oct. 26, is counting on producing 25,000 cars between now and Jan. 1, or practically double its activity in the corresponding period of last year.

This week both Ford and Chevrolet are expected to achieve something resembling a substantial start on 1936 models. Ford experienced considerable delay in getting the new type radiator grilles in production on a quantity basis. Last week, Ford assembled 2010 units.

Due to exceptionally good demand for the 1935 line, Chevrolet had not planned an earlier start on the new series. As previously noted, Chevrolet has bought material for 250,000 units, its largest initial buy, and has been pressing its suppliers and in cases has tripled its original commitments. Chevrolet last week made several thousand of the new models.

Pontiac and Olds last week both had topped a weekly rate of 2000 units by a good margin. Pre-views of both are scheduled for next week, but little change will be seen other than refinements in body lines and radiator grilles. Pontiacs sold in the Southwest will be equipped with copper-lead instead of cadmium-silver bearings, to avert the corrosion by acids in oil noted last week.

Packard lifted the daily rate of its small job to 300 a day last week, and whereas it had contemplated assembling about 6000 of this series in October its goal now is 7200, due to good retail demand.

The mechanically-minded should take a good look at the manner in which Packard has hinged the doors on this series at the front. This unique hinge, recessing into the cowl, permits the rake of the door to be continued to the bottom, providing needed toe room for the driver's egress. Other manufacturers have attempted to accomplish this, and Packard apparently has devised something that will be widely copied.

Graham is experiencing such a good run of business in its current models that it has scheduled 1000 more before swinging into the slightly-changed 1936 series. Graham's weekly rate is 400 at present.

Although Nash brought out its 1936 lines only a few weeks ago several new models are expected to be shown at the New York show beginning Nov. 2. The fact that Doehler at Toledo has been busy on two die-cast radiator grilles for Nash lends color to this indication. The Hudson and Hupp die-cast radiator grilles are being made by Precision, at Syracuse.

GMC Leads Production

Weekly production rates, other than those previously enumerated, include 3500 for Buick, 500 for Cadillac-La Salle, 2500 for Dodge, 1500 for Nash-Lafayette, 350 for Reo and 25 for Pierce-Arrow. The total for all Chrysler lines was 5500, and for all General Motors 11,250.

This swing into production on a rapidly-ascending scale broke the jam for suppliers last week. In general, releases came tumbling in, and October shipments of parts and materials to Detroit will be the heaviest in four months. Automobile manufacturers are now talking delivery, not price.

It is becoming noticeable that manufacturers are also skittish in talking prices of their new models. Buick has announced some reductions, but not sufficient in the lower range of its jobs to disturb the market. Each maker is waiting for the other to take the lead. It does not seem likely that there will be any radical changes, at the outset at least.

Two recent sporting events have greatly enthused Detroit over the prospect for automobile sales. One is the Louis-Baer fight and the other the baseball world series. Both have drawn such large gates that the automobile industry is convinced the public has money to spend. The tendency from now on will be to increase authorizations for promotion and to stick the spur further into salesmen.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,700
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,727
June	249,727	306,477	361,321
July	229,357	264,933	337,044
Aug.	232,855	234,811	240,051
Sept.	191,800	170,007	*77,000
9 mo.	1,634,126	2,384,014	*2,916,240
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:

Sept. 21	12,600
Sept. 28	15,994
Oct. 5	24,770

WINDOWS OF WASHINGTON

WASHINGTON

THERE is "confusion worse confounded" these days at both the NRA and the federal trade commission as the result of the two executive orders issued by President Roosevelt just prior to leaving for his western trip and the so-called "explanation" of these orders issued subsequently by the White House secretariat.

The two orders referred to deal with the appointment of Major George L. Berry as co-ordinator for industry and the putting of labor provisions in the trade practice rules of the trade commission.

In the first place, there has been determined opposition to the appointment of Major Berry which has been followed by the resignation of several of the NRA officials, and more are to follow if the rumors are correct.

Labor Man Rules NRA

It is this same Major Berry, incidently, who was a large factor in keeping the structural steel industry from ever getting its NRA code. Presumably, Major Berry is going to have the dominant position at NRA.

Back of all the ups and downs of the whole situation is the determined rumor that the President does not want voluntary codes to succeed, so that he can go to congress with that statement and get permanent legislation.

In the case of the appointment of Major Berry, there is the feeling that the President has in mind the fact that he will never be able further to extend the NRA, and he is putting himself in the position of telling labor to go out and see what it can do with industry.

One of the controversial matters that has been brought up is the question, under both the executive orders and the explanation issued by the White House, as to whether NRA or Major Berry shall have jurisdiction over the labor provisions in the trade practice rules, if there are to be any.

The appointment of Major Berry to the new position as co-ordinator for industrial co-operation is being looked upon as the first step in an investigation to determine whether new NRA legislation should be enacted or what other move the government should make in connection with supplanting the old NRA with some new arrangement for regulation of co-operation.

An interesting story is going the rounds both at NRA and the trade commission in connection with the issuance of these two executive orders. They were issued late the night the President left on his trip, and a so-called "explanation" was to have been issued at the same time. This latter was not released for some reason or other—perhaps because it was too late.

The orders themselves came out, and because they were so loosely drawn almost any interpretation could be placed on them. This led to open disputes among the various NRA factions until one of the White House representatives heard about it and immediately wired the President for permission to release the "explanation."

This authority was granted, and the explanation was then issued.

How Explain the Explanation?

Now, those who are trying to find out just where they stand want an explanation of the explanation. This White House explanation of the executive orders is about as involved and contradictory as the orders themselves.

In the meantime, some of those at NRA who are not so keen about Major Berry's appointment are alluding with considerable fun to the press release which he had given out the minute the President appointed him to his new position.

In this press notice Major Berry points out that he is "outstandingly qualified to assume the duties of this new office," and he continues at length to tell just how good he is.

"A native son of eastern Tennessee," says the release, "Major Berry has become one of his state's most distinguished and influential citizens. He has resisted repeated attempts to make him both governor and United States senator."

The entire release, of about a newspaper column in length, is replete with similar statements.

The explanation of the labor provision procedure for trade practice conferences does not change the explanation given in these columns last week. In other words, industry can file trade practice rules either with or without labor provisions.

May Roil Borah

It was pointed out by the President in a letter to Sen. Pat Harrison, chairman of the senate finance committee, that "such agreements," referring to those containing labor provisions, "when approved by the President, as to matters covered by the joint resolution, are exempted expressly from the penalties of the antitrust laws, including criminal prosecutions, injunctions and treble damages."

Attention has been called to the fact that Senator Borah took exception to this language when it was discussed on the floor of the senate and was given assurances that no such exemptions would be made.

However, in the White House "explanation," this letter is repeated verbatim, giving industry the very definite assurance that if it includes labor provisions in its trade practice conferences such exemptions will be granted.

At a press conference last week Major Berry stated that he had not decided whether he would call one general conference of industry and labor or whether he would call in related groups, one at a time.

Prior to the calling of any con-

ference, Major Berry will send out letters to all industry asking if it cares to take up voluntary codes or if it would rather have future legislation.

In direct answer to the question as to whether he thought that industry and labor are both thoroughly sick of conferences and the NRA generally, he stated that he thought this might be the case in some industries but he knew it was not in others.

At his conference Major Berry stated that there are two definite phases of the question which require his attention at this time. They include:

"1. To give the fullest degree of encouragement to the development of voluntary agreements contemplated by the recent executive order establishing certain definite relationships between the federal trade commission and the NRA. In this I shall give the fullest measure of assistance in composing such differences as may arise with a view of consumating at the earliest possible date such voluntary agreements as are permissible under the law.

"2. It will be my purpose to obtain from both management and labor in industry their attitude with regard to the development of some permanent procedure for establishing fair trade practices in industry. This work will involve many conferences between management and labor with a view to establishing a program that both feel will be helpful in developing and maintaining prosperity and stability in industry. There is no law to compel conferences and this is not an undesirable situation, because in my judgment, the processes of persuasion and frank discussions, and in the end, agreements, will lead to the most lasting results."

In a letter sent to Senator King of Utah last week, NRA states that it still has 2760 employes on its payrolls with a total annual salary of $6,963,220.

SUPPLY COMMITTEE'S BUYING POWER IS UNDER FIRE

Steel and allied producers are going to be very much upset when they wake up to a new wrinkle that has been developed by the government in some of its purchases.

In connection with the treasury department there is a so-called general supply committee, which originally bought office and similar supplies for the government departments at Washington.

During the past few years this committee has taken to the purchase of pipe, structural steel, re-inforcing bars, and similar commodities.

During the past few months the President has appointed state procurement officers, and recently these officers have been purchasing pipe and other supplies through the general supply committee which, it is reported, is shipping carloads of pipe to all sections of the United States.

This means that whoever holds the contract with the supply committee for either six months or a year is now getting all of this business throughout the country.

Already complaints are being received by the government from steel firms. The supply committee and the state procurement officers all are under the direction of Admiral Peoples, procurement officer of the treasury department.

NEW DEAL LEGAL DOUBTS FILL SUPREME COURT DOCKET

When the United States Supreme Court convenes in its new $9,000,000 home on Oct. 7 it will have pending before it for consideration an unusually large number of petitions asking it to exercise its discretion to review cases which have been decided in the lower courts—with emphasis on a number of new deal cases.

The general rule of the court is to undertake to review cases which involve important questions of law not decided by earlier cases of the Supreme Court, and to review cases in which the lower courts have come to different conclusions on the same questions.

Many of the applications for review this year undertake to show that there are important questions of law not determined by earlier decisions of the Supreme Court.

There are a number of new deal laws on which action will be asked, and while these in themselves are important, they might lead to final decisions on other questions—such, for instance, as the Schechter NRA case did.

Some of the questions to come up for review at this time are the cotton control act, cotton processing taxes under AAA, Tennessee Valley Authority, PWA loans and grants to competing municipal power plants, PWA condemnation of lands for slum clearance, state taxation of RFC property, corporate reorganization act, right of state associations to change to federal savings and loan association, depriving federal courts of jurisdiction over electric and gas rates where there is adequate remedy in state courts, and many others.

SKF Steels Inc. is moving its main office to 369 Lexington avenue, New York.

Why Steel for Building? 14 Reasons

SPEAKING before the Canadian Institute of Steel Construction in Toronto, Ont., Sept. 24. V. G. Iden, secretary of the American Institute of Steel Construction Inc., New York, cited 14 compelling reasons for preferring steel to other building materials. They are:

1. Steel is the symbol of strength. The isotropous and resilient properties of structural steel are in such perfect balance that it is the strongest of all materials per unit of weight and volume.

2. Steel insures security. The mechanical manipulation of the hot, plastic material by the rolls produces a homogeneous product of dependable, uniform consistency and known strength.

3. Steel makes for speed. Steel structures are the most rapidly and safely built and makes possible the earliest use of the investment, resulting in quicker returns on land and capital.

4. Steel is compact. It assures the greatest economy in rentable or usable area because it is the most compact building material, i.e., it occupies less space per unit of strength.

5. Steel reduces fire risk. It is the only incombustible structural material because it is incapable of being burnt, decomposed or consumed by fire and can be surely insulated against any possible conflagration hazard.

6. Steel will endure. Of all structural materials, steel is the least vulnerable to the destructive action of the elements and of time, and is the most easily and effectively protected therefrom; when properly maintained, it is the most durable.

7. Steel is elastic. This is a most valuable quality. Steel is the only structural material that is resilient and returns to its original form after being distorted by properly-designed load stresses of whatsoever duration.

8. Steel is adaptable. It is the only adaptable fire-resistive structural material that can be assembled into structural frames, reinforced, rearranged, disassembled and reused in new structural frames.

9. Steel is uniform. It can be purchased with the full assurance that it will conform to recognized standards because its physical and chemical properties are frozen into it at the mills.

10. Steel is a dreadnaught. To all extremes of the compass and in all climates structural steel is ready to perform its inherent function in any construction project.

11. Steel is foolproof. It has blazed the paths of civilization because it can stand the rigors of the elements and of the crudest forms of transportation and handling.

12. Steel is economic. It is the strongest building material per unit of weight and volume and the lightest building material per unit of weight and volume and the lightest building material per unit of strength. The builder gets more performance for every dollar spent.

13. Steel can be salvaged. Steel structures are most easily and economically altered, reinforced for additional loads, taken down and re-erected or marketed for other use.

14. Steel is responsible. It is backed by millions of dollars invested in plant and equipment, the managements of which make steel an established, permanent, standardized and dependable element of the construction industry.

Industrial Men in the News

Carl A. Ilgenfritz, Manager of Purchases and Raw Materials, Republic Steel Corp.

He now heads up all purchases and raw material negotiations for the third largest steelmaker.

A native of Youngstown, he has been affiliated with the steel industry exactly 30 years.

He came into the Republic organization via the Central Alloy Steel Corp.

CARL A. ILGENFRITZ has been appointed manager of purchases and raw materials for Republic Steel Corp. He has been director of purchases for Republic since May, 1930, and in addition to his former duties will now have charge of all raw materials, leases, and purchases and sales of mining properties.

A native of Youngstown, O., Mr. Ilgenfritz entered the employ of the Youngstown Sheet & Tube Co. in 1905, as a storekeeper. Subsequently he entered the mechanical department, and in 1913 joined the engineering department of the Brier Hill Steel Co., where he was appointed assistant purchasing agent in 1917. He became purchasing agent in October, 1918.

Subsequently he organized the Stroh-Ilgenfritz Co., Youngstown, dealer in coal, coke, pig iron, and alloys, now the Stroh-Butler Co. Resigning as vice president of this concern on March 1, 1924, he became assistant purchasing agent for the Youngstown Sheet & Tube Co.

He was named general purchasing agent for the United Alloy Steel Corp. at Canton, O., in March, 1925, and in October of the following year became director of purchases for the Central Alloy Steel Corp., Massillon, O.

When the Republic Steel Corp. was organized in May, 1930, by the merger of Republic Iron & Steel Co., Central Alloy Steel Corp., and other leading producers, he became director of purchases of Republic.

Mr. Ilgenfritz is a member of the National Association of Purchasing Agents, and was president of its Canton and Eastern Ohio section in 1928. He is also a member of Rotary.

♦ ♦ ♦

Jules A. Morland, since 1927 with the Timken Roller Bearing Co., Canton, O., has been appointed technical representative in South America with headquarters at City hotel, Buenos Aires, Argentina. A mechanical engineer graduate of Rensselaer Polytechnic institute, he has been sales engineer in the railroad division. He will also represent in South America the associated Timken organizations now established in other countries.

Charles H. Elliott

Formerly manager of the Warren, O., district of the Republic Steel Corp., who as announced in STEEL for Sept. 30 has been promoted to manager of both the Youngstown and Warren districts

♦ ♦ ♦

Edward L. Ryerson Jr., president and a director of Joseph T. Ryerson & Son Inc., Chicago, a leading warehouse interest until its consolidation with the Inland Steel Co., Chicago, recently, was elected vice chairman of the board of Inland Sept. 30.

Edward L. Ryerson Jr.

Mr. Ryerson entered the employ of the Ryerson company in 1909 on leaving college, and has been identified with it since, becoming president in 1929.

Active in social and civic work in Chicago, he is also a director of the American Brake Shoe & Foundry Co., New York Life Insurance Co., Northern Trust Co., and Quaker Oats Co., is a fellow of the Yale Corp., and a trustee of the University of Chicago.

♦ ♦ ♦

J. H. Hillman Jr., chairman of the Hillman Coal & Coke Co., Pittsburgh, has been elected a director of Compressed Industrial Gases Inc., Chicago.

♦ ♦ ♦

Norman I. Stotz resigned as general superintendent, Braeburn Alloy Steel Corp., Braeburn, Pa., effective Oct. 1 and has become affiliated with the Cyclops Steel Co., Titusville, Pa., in a metallurgical capacity. He was associated with the Braeburn corpo-

ration for 14 years. Last spring he completed two years as chairman of the Pittsburgh chapter of the American Society for Metals.

♦ ♦ ♦

Edward C. Bull, of Buffalo, has been appointed sales manager for the William C. Carr Corp., manufacturer of air conditioners and heat generators, of Buffalo.

♦ ♦ ♦

W. C. Holzworth, president, Struthers Iron & Steel Co., Struthers, O., was seriously injured in an automobile accident near Youngstown, O., Sept. 27. He is recovering.

♦ ♦ ♦

W. P. Snyder Jr., president, Shenango Furnace Co., Pittsburgh, has been elected president of council of the new Sewickley Heights borough, a suburb of Pittsburgh.

♦ ♦ ♦

G. G. Coolidge, vice president, Harbison-Walker Co., Pittsburgh, has been appointed chairman of the special gifts division of the Pittsburgh Community fund campaign for 1936.

♦ ♦ ♦

Dr. R. J. G. McKnight has been appointed president of the Keystone Driller Co., Beaver Falls, Pa., succeeding Leslie M. Johnston, who was also director of public works in Pittsburgh.

♦ ♦ ♦

P. F. Lavedan, vice president, Liquid Carbonic Corp., Chicago, and C. W. Dempsey, secretary and comptroller, have been elected directors, filling two of four vacancies. The board has been reduced from 13 to 11 directors.

♦ ♦ ♦

Joseph Michaels, of Hyman-Michaels Co., Chicago, has been appointed the national counsellor of the Institute of Scrap Iron and Steel to represent the Institute in the national council of the United States Chamber of Commerce at Washington. Announcement was made by Joel Claster, president of the Institute, in New York.

♦ ♦ ♦

John D. Swain, vice president of the Linde Air Products Co. and Union Carbide Sales Co., has been appointed vice president of the Electro Metallurgical Sales Corp. All three companies are in New York and are subsidiaries of the Union Carbide & Carbon Corp. Mr. Swain has been associated with these units for 20 years, and will have offices at 30 East Forty-second street, New York.

♦ ♦ ♦

R. I. Ingalls, president of the Ingalls Iron Works Co., Birmingham, Ala., and Verona, Pa. has been appointed to the Alabama State Docks commission.

♦ ♦ ♦

R. M. Marshall, since October, 1933, vice president and general manager of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., has resigned to go with the Woodward Iron Co., also of Birmingham. Mr. Marshall joined Sloss-Sheffield in October, 1932, as assistant to H. A. Berg, who is now president of the Woodward company.

John D. Swain

♦ ♦ ♦

Dr. John S. Unger, manager of the research bureau of Carnegie Steel Co., whose resignation was noted recently, was born in Tarentum, Pa., Oct. 13, 1865, attended the public schools of Tarentum, and entered the Western University of Pennsylvania (now University of Pittsburgh), from which he graduated in 1887 as an analytical chemist, and later was awarded the honorary degree of Doctor of Science.

His first position was that of apprentice carpenter in Tarentum. On

(*Please turn to Page* 86)

Dr. John S. Unger

Died:

H. C. FOWNES, 79, pioneer Pittsburgh industralist and one of the founders of Standard Seamless Tube Co., Ambridge, Pa., and Midland Steel Co., Midland, Pa., at Pittsburgh, Sept. 28. He was one of the organizers of the William Clark & Sons Co. which built one of the first steel mills at Homestead, Pa., and was also identified with the formation of the old Solar Iron Co., Rust Boiler Co., and Reliance Coke Co. Mr. Fownes was well known as an amateur golfer, and had been president of the Oakmont Country club, Oakmont, Pa., for the past 32 years.

♦ ♦ ♦

William C. Turner, 70, retired district manager of the Detroit Graphite Co. at Buffalo, Sept. 27 in Buffalo.

♦ ♦ ♦

Edward H. Breitweiser, 63, president of the Buffalo Co-Operative Stove Co., Buffalo, for the past 30 years, last week in Buffalo.

♦ ♦ ♦

Merton B. Lamkins, general foundry manager for the Chrysler Corp., Detroit, and widely known as an expert on automotive castings, in Detroit, Sept. 27.

♦ ♦ ♦

Herman A. Krentz, superintendent of the E. & B. Holes Machinery Co., Buffalo, Sept. 25 in Buffalo. He was 62, and was in the company's service 47 years.

♦ ♦ ♦

Marie Root, 45, president and general manager of the Root Spring Scraper Co., Kalamazoo, Mich., in that city Oct. 1. Miss Root entered the business with her father, the late Fred N. Root, founder of the company, in 1920, and succeeded to the management at his death in 1925.

♦ ♦ ♦

Walter C. Ely, 74, one of the organizers in 1901 of the Highland Iron & Steel Co., Terre Haute, Ind., and for years treasurer and general manager, Sept. 30. He was a leader in community activities. He also organized the Wabash Fiber Box Co., and served as its president.

♦ ♦ ♦

Charles H. Hyatt, 62, electrical engineer, son of the late John Wesley Hyatt, inventor of celluloid and founder of the Hyatt Roller Bearing Co., Newark, N. J., at his summer home in Amityville, Long Island, Sept. 27. He was born in Newark and was graduated from Columbia university in 1896, with an electrical engineering degree. At various times he was employed in an engineering capacity by the Crocker-Wheeler Co., and the Sprague Co., both of Bloomfield, N. J., and the Marine Engine & Machine Co., Harrison, N. J.

EDITORIAL

Merchandising Effort Should Match Technical Progress

IT IS difficult to observe the present trend of developments in the iron, steel and metalworking industries without realizing the necessity of more intelligent merchandising and more aggressive sales effort.

Everywhere one turns, he finds improved materials, parts, machinery, equipment, accessories and processes. Unfortunately, many potential users of these products and methods either do not know that they are available or are not fully aware of their advantages. In other words, it appears that in the past few years the ability of industry to create new and better products and methods has exceeded its capacity to apply them profitably.

Proof of this was afforded by the National Metal congress and exposition held last week in Chicago. Persons who attended the technical sessions and witnessed the show were impressed by the great variety of new materials and improved processes now at the disposal of the metalworking industries. Manufacturers now have a wider choice of ferrous and nonferrous metals and alloys than at any previous time.

Industry Should Learn How To Capitalize Results of Research More Effectively

William A. Irvin, president of the United States Steel Corp., speaking at the annual dinner of the American Society for Metals on Thursday evening, appropriately paid a high tribute to those responsible for technological progress in the industry. He enumerated seven departments in which "improvements—the results of organized research—have been so numerous and important that only a group of experts, such as those now present, could possibly comprehend their full significance."

Mr. Irvin also referred to a "few of the fields in which the enlarged use of steel, or its adjustment to new conditions, is receiving considerable attention." Here he cited the use of alloy steel in streamlined passenger trains, street cars, trucks, buses, airplanes, and in the superstructure of ships. He touched upon the attractive potential market for steel in residences and in containers for beverages.

"Examples might be multiplied," he commented, "but enough has been said to indicate that in the development of new trade requirements and in the constant shifting of the old there is an important place for steel. It is our duty and responsibility to keep it so."

That responsibility, upon which Mr. Irvin places such timely emphasis, involves not only continued activity in developing new materials and methods and improving old ones, but also greater and more intelligent effort in properly applying the materials and processes already developed. This means that the profit possibilities of present irons, steels and nonferrous metals must be dramatized so effectively that they will be employed more advantageously throughout industry. It means that every effort should be made to speed progress in merchandising in the hope that it may catch up with the advances in the research, metallurgical and production branches of the industry.

Producers Cannot Know Too Much About Details of Applying Products to Buyers' Needs

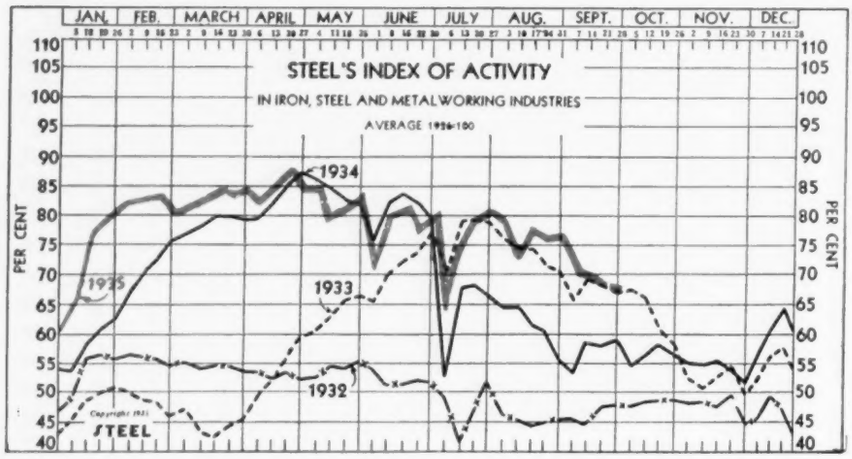
We believe that one way in which merchandising can be improved is through a more thorough understanding by producers of the exact problems of the fabricators and users of steel and other metals. In the case of some of the high strength, low alloy steels now on the market, a few fabricators and users seem to have delved more deeply into the characteristics of these steels than have the experts of the companies which produce and sell them. It is not unusual to find a technical-minded user of some of these new steels who is more enthusiastic over their possibilities than are the makers of the steels.

The explanation of this situation lies in the fact that the fabricators and users are closer to the problems of applying the steels. When they discover an alloy which serves a given purpose more satisfactorily than any other material they have tried, their minds automatically suggest other applications of similar character. The steel company whose sales organization can get close enough to these new-steel enthusiasts among steel fabricators and users to catch the contagious spirit of their zeal for finding new and profitable applications will double the effectiveness of its selling effort.

The streamlined trains, beer cans of tin plate and other spectacular applications of steel mentioned by Mr. Irvin barely scratch the surface of the potentialities in materials and methods now available. To dig down deeper into pay dirt presents probably the richest opportunity that has ever faced the steel industry.

To capitalize upon it fully, sellers of steel must get closer to the problems of applying their products to industry's current requirements.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries declined 1.0 points to 68.4 in the week ending September 28.*

Week ending	1935	1934	1933	1932
July 20	79.8	68.1	79.4	51.5
July 27	80.8	66.4	78.8	46.1
Aug. 3	78.4	64.6	75.9	45.1
Aug. 10	73.4	64.6	74.7	44.6
Aug. 17	77.5	61.4	74.2	44.9
Aug. 24	77.0	60.3	71.6	45.2
Aug. 31	77.3	55.1	70.3	45.4
Sept. 7	70.9	53.5	65.5	44.9
Sept. 14	70.1	58.7	69.1	47.8
Sept. 21	69.4†	58.1	68.2	48.0
Sept. 28	68.4*	59.3	66.9	47.7

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL.) *Average for* 1926 *equals* 100, *weighted as follows: Steel rate* 40, *and car loadings, power output and auto assemblies each* 20.

Course of Business Will Be Smoother in October

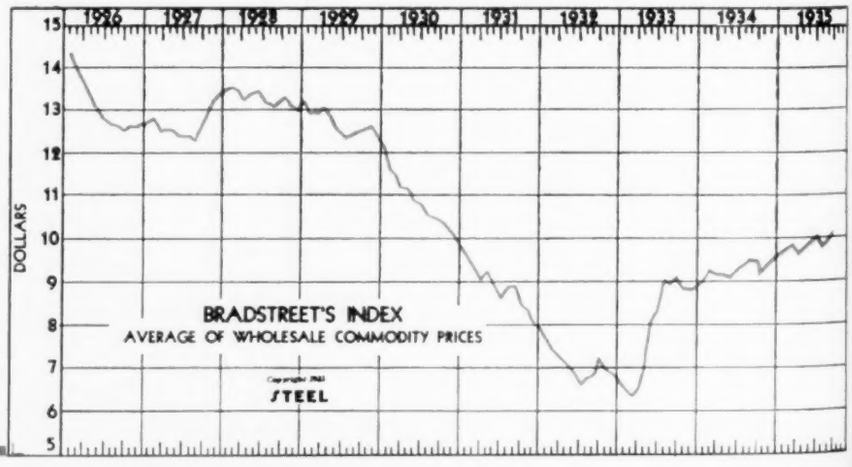
SIGNS that some of the factors which made for an unbalanced industrial activity in September may move more harmoniously in October were apparent in the first week of the new month.

Automobile output, while still at low ebb, has begun to expand and should become a strong factor in bolstering the trend of general business before the end of the month. Steelworks operations, which have moved indecisively during the past few weeks, again seem to be pointing toward a higher, sustained level. The slightly increased output of pig iron in September and the gain of a few active stacks points to an improvement in steelmaking in the tenth month.

The two general indicators—car loadings and electric power output—continue to reflect the substantial widespread activity which exists in many lines of business for which statistics are not available. Car loadings, after two unusually good weeks, were off in the week ending Sept. 28 because of another of the frequently threatened coal crises. Power output in the same week touched 1,857,470,000 kilowatt hours, and for the second consecutive week was close to the all-time record of 1,860,000,000 established in the third week of December, 1929.

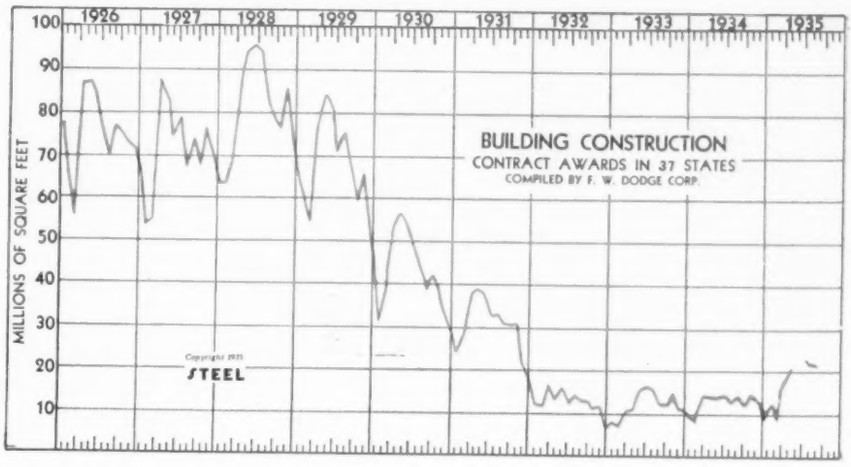
STEEL's index of activity, which has been wavering uncertainly, will show a positive upturn when the figures for the week ending Oct. 5 are available.

	1935	1934
January 1	$9.49	$9.01
February 1	9.78	9.26
March 1	9.79	9.17
April 1	9.66	9.16
May 1	9.79	9.14
June 1	9.90	9.24
July 1	9.84	9.32
August 1	9.91	9.48
September 1	10.00	9.45
October 1	.....	9.27
November 1	.....	9.29
December 1	.....	9.49

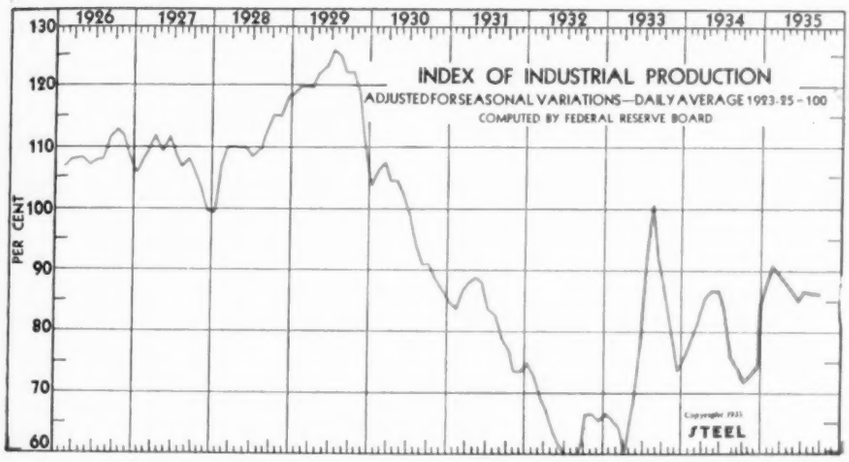


Building Construction Unchanged in August

	Square Feet	
	1935	1934
January	11,245,100	9,568,700
February	9,670,300	8,176,300
March	15,873,100	14,788,900
April	19,981,100	14,207,100
May	22,276,200	14,664,400
June	22,878,800	13,986,500
July	21,565,900	13,250,000
August	21,545,400	14,259,000
September		12,510,300
October		15,098,100
November		12,780,800
December		9,193,300



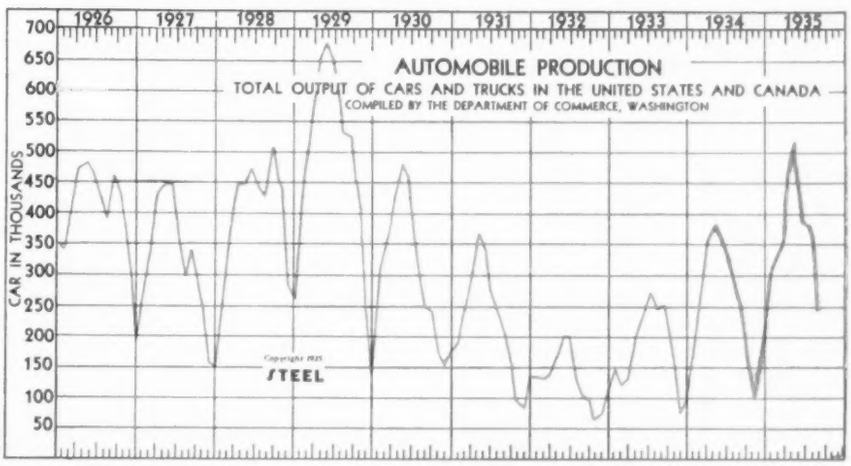
August Industrial Production Holds at 86

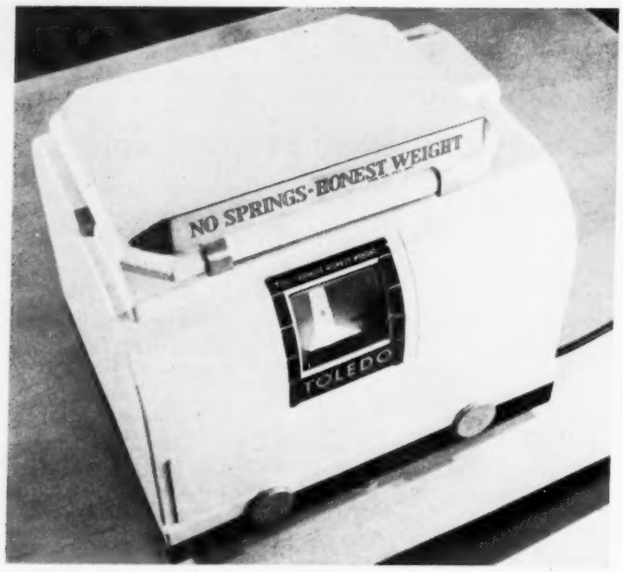


	1935	1934	1933
January	91	78	65
February	89	81	64
March	88	84	60
April	86	85	67
May	85	86	77
June	86	84	91
July	86	75	100
August	86	73	91
September	....	71	84
October	....	73	77
November	....	74	73
December	....	86	75

Automobile Output Continues Seasonal Decline

	1935	1934
January	303,372	162,570
February	358,658	238,827
March	451,809	352,614
April	501,837	371,338
May	385,486	350,616
June	377,065	320,382
July	350,118	276,047
August	247,743	244,715
September		175,586
October		135,771
November		85,179
December		156,356





New Toledo scale case, reported to be the largest urea molding ever produced. Many metal parts are employed in the assembly, and 7 tons of die steel was required for making the mold for the Plaskon case

MOLDED PLASTICS AS ADJUNCTS TO METAL ASSEMBLIES

BY HERBERT CHASE, M. E.

WITH molded plastics gaining new applications daily, it is natural, perhaps, they should sometimes be considered as competitors of metal. While it is true, they sometimes displace metals, anything but a cursory study of the situation will reveal quickly they are really most valuable adjuncts to metals. In addition, production of plastic parts gives rise to the use of large quantities of iron and steel for dies, molding presses and supplementary equipment. In many instances plastics are combined with metals to the advantage of both types of material. For these and for other reasons, plastics have become firmly entrenched, and engineers, designers, and production men who do not make the most of them where their use is logically indicated are merely passing up what might be a decided asset.

If this is granted—and it can hardly be denied by those who know the true situation—it may be well to state briefly some of the advantages which result from the use of plastics and then to cite some examples of their profitable application in combination with metals. Only the molded types of plastics need be dealt with here, but it should not be forgotten that, in addition, there are both laminated and cast types, available in sheet, rod and tubes, which are readily machined and do not, as a rule, require any investment in molding equipment.

Diversity of Uses

Laminated phenolic plastics are used widely for rolling-mill bearings which may be lubricated with water (STEEL, Sept. 16, p. 22), and to some extent for gears where silent operation is sought.

Plastics also are used extensively as dielectrics, but their electrical insulating properties, though excellent, are either secondary or of no importance in a large proportion of uses. Perhaps the greatest advantage of the molded plastics is the facility with which they are formed into either simple or complex parts which can be held within close dimensional limits. It is of great importance that such parts come from the mold practically ready for use. Aside from a quick and simple removal of fins where the mold parting occurs, no machining ordinarily is required. Still more important is the fact that no applied finish is required, yet an almost unlimited variety of colors can be obtained. If the mold is polished, as is customary, the molded part has a similar luster which it holds indefinitely, as the molding is noncorrodible and inert. Since the color is intimately mixed with the molding compound, there is nothing to correspond to the chipping off or wearing through of an applied coating on metal.

Molding Characteristics Differ

For the benefit of those unfamiliar with plastics and their fabrication it may be well to sketch briefly some of the fundamental factors. Plastic molding usually involves placing a molding compound, generally in powdered or granular form, in a mold, to which sufficient heat is applied to soften or flux the compound and simultaneously applying pressure to force the material into the shape of the mold cavity.

Two general types of plastic materials, termed thermoplastic and thermosetting, behave somewhat differently under heat. Thermoplastics change only physically with heat and sometimes are heated to plasticity before introduction into the mold. Thermosetting plastics, as their name indicates, undergo a change chemically as well as physically when heated. Heat causes them to flux and then to set to an infusible and insoluble form which does not soften or deform to any extent if subsequently reheated even to the molding temperature. Thermo plastics are again rendered soft if reheated to or near the molding temperature often after molding. When they are being molded, the mold requires cooling to solidify the molded product before the latter is removed from the mold.

Plastic molding materials usually are supplied in powder form and are frequently tableted or shaped (generally without heating) by the molder into what are known as "preforms" before the final molding operation.

Plastics, in general, comprise a wide range of materials, the most familiar being rubber. Others include pyroxylin, shellac, casein, cellulose acetate and various synthetic compounds. The latter, including phenol formaldehyde compounds sold as Durez, Bakelite and Textolite among other trade names, and urea-formaldehyde compounds such as Plaskon, Beetle and Unyte, have been the most important factors contributing to the recent growth of the plastic molding industry.

Other Characteristics

Phenol-formaldehyde resin is a product of the reaction of phenol (carbolic acid) and formaldehyde in the presence of a catalyst. After formation, the molding type of resin is ground and in general is mixed with a filler for use in plastic molding. Fillers include wood flour, mica, asbestos, canvas scraps and other materials and comprise, as a rule, about 50 per cent of the plastic material, the balance being the resin, which acts as the binder.

Urea-formaldehyde resins are condensation products of urea and thiourea with formaldehyde, and are usually mixed with pure cellulose pulp or with ground paper filler. They differ chiefly from the phenol-formalde-

hyde resins in that the latter are usually darker in color or trend to darken with exposure to light, whereas the former are light in color and are not subject to darkening. For these reasons, the ureas are used chiefly for making white and pastel shades of moldings and the phenolic type for black and dark colors. Most urea moldings are translucent whereas most phenolic moldings are opaque.

Plastics do not have the strength of most metals, but some forms, in proportion to their weight, are among the strongest materials known, for they are lighter than any metals and weigh, as a rule, about one-sixth as much as steel. Being poor conductors of heat, plastics make excellent handles and are pleasing to the touch. Their natural beauty and color also make them excellent for decorative parts. They are resistant to moisture and to weathering and are not affected by lubricating oils. In view of their light weight, the molding compounds are not expensive. The forms most widely used range in price from about 12 cents up to about 35 cents per pound, depending on color, nature of filler, and other factors.

These, then, are some of the advantages and properties of the more important types of hot-molding plastics. It remains to point out specific applications which illustrate how they are used to advantage in conjunction with metals.

Large Urea Scale Case

A striking though somewhat exceptional application is the molded urea plastic case for the new Toledo scale shown in an accompanying illustration and first announced in STEEL of Aug. 5, p. 25. This case is the largest urea molding ever produced. It weighs about 9 pounds and measures 17 3/4 by 15 3/8 inches in base dimensions and is 15 3/4 inches deep. Incidentally, some 7 tons of die steel was used in making the mold and a special hydraulic press, probably the largest ever made for molding work, had to be built especially for making this molding. The new case requires no applied finish and comes from the mold practically ready to assemble into the scale. Thanks partly to the use of the plastic and to a design in which considerable aluminum is employed, the new scale weighs about 55 pounds, just one third as much as its predecessor. The advantage from a standpoint of portability and reduced shipping cost is evident. Assembly and finishing costs are also greatly reduced, as with many assemblies in which plastics are employed.

Electric toasters often have bases and handles molded from black phenolic plastic. In such cases the base serves both as an electric and a heat insulator, but it has several inserts of metal and serves as a support for several metal parts. At the same time, its gleaming black surface, which of course has no applied finish, affords a smart and pleasing contrast with the chromium plated metal. It also combines several parts which could not be made into a single assembly so readily without a plastic and greatly simplifies the complete assembly of the toaster. That the plastic is a valuable adjunct to metal in this instance is evident.

In many a food store, cast iron meat choppers and coffee grinders painted a garish red are still to be found, but the modern store finds such unsightly equipment giving place to more modern designs in which plastics play their part. A recently announced meat chopper is a case in point. Metal parts are largely zinc die castings with brushed chromium finish but colorful shades of urea plastic—a delicate green being used mainly—are employed for the molded casing, although some black phenolic cases have also been used. Smart appearance and clean, smooth, sanitary surfaces without need for an applied finish account for the use of plastics in this instance.

Usng Plastics for Parts

In the radio field, plastics are more likely to displace wood than to take the place of metal, but many combinations of metal with plastics are found. A popular midget set, for example, has a black phenolic case trimmed with prefinished chromium-plated sheet metal parts. Here again, fine appearance without need for any applied finish, and probably a marked saving in production cost account for the use of a plastic. But metal still serves for trim as well as for other parts.

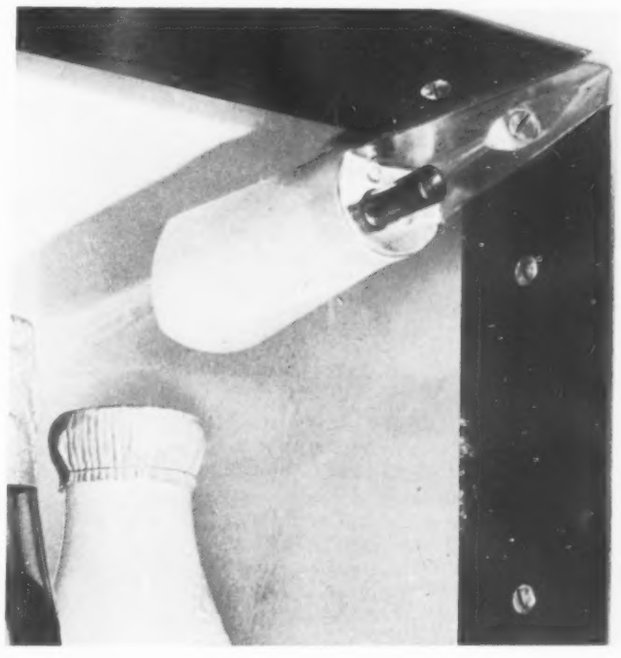
Still another instance in which plastics supplement metals is found in the Kelvinator electric refrigerator. Steel and other metals form the bulk of this household appliance, but plastics too are needed. In this instance translucent urea plastic is selected, and is molded into a shield for an electric light. Some of the light passes through and is diffused by the plastic and some is reflected from its surface as well as from the adjacent surfaces. The plastic shade is sanitary, light in color, easily cleaned and not easily broken. Its support, however, is plated metal. Plastics of some form, probably phenolic, are also used for the automatic switch parts and for the laminated door jambs or breaker strips shown in the illustration. Moisture resistance and smooth surfaces, which plastics afford without an applied finish, are factors in parts of this type.

An accompanying illustration shows several automotive parts in which phenolic moldings are combined with metal to great advantage. Every automotive vehicle produced today has from two to three to a score or more of such parts. Where the plastics are employed as dielectrics, they serve, of course, a function which no metal could perform. But both phenolics and ureas are used also for many decorative parts and the phenolics are employed also for mechanical parts, including gears, where shock resistance, silence in operation, and good resistance to wear are factors of importance. In many instances, hubs, shanks, bezels and decorative parts of metal are combined with the plastic for rather obvious reasons.

Permit Passage of Diffused Light

Urea plastics are sometimes employed, as in instrument dials and domelight covers, to permit the passage of diffused light, and are much less fragile than glass parts. Light-colored urea knobs and other decorative parts are also popular.

In aircraft, molded phenolic instrument cases, shown in an accompanying illustration, are being employed because of light weight, freedom from corrosion and ability to stand up indefinitely without any applied finish. Here, as in other aircraft applications,



KELVINATOR refrigerator light reflector molded from translucent white Plaskon. Breaker strips are of laminated plastic, but most of the remaining parts are of metal

Group of molded Durez parts, chiefly automotive, used for dielectric and decorative units in which metal inserts are included

there is a combination with metals beneficial to both types of material.

In the hardware and cutlery field, plastics are also making themselves useful as well as ornamental. A case in point is found in a new line of door hardware. Knobs are molded from plastics in a variety of colors and are held securely between die cast or stamped metal parts. They provide the pleasant "feel" as well as the fine appearance of plastics. Customers are offered a choice of a wide range in color, but as the knobs are detached quickly, the dealer need carry only a moderate stock to give almost any choice desired.

Effect on Sales

An executive of the company which produces this line reports making a recent sales trip through twelve western states in which builders' hardware accounts were sold readily in each city visited. He says, "It was the most unusual selling experience I have ever had and it illustrates better than anything else could the universal appeal of this innovation in builders' hardware."

The innovation referred to is the use of plastics and shows how their intelligent combination with metals can be made to promote sales. Door knobs molded from plastics are not strictly a novelty, but hardware manufacturers in this country have been rather slow in appreciating their advantages, though they are employed extensively abroad. Incidentally, they have the advantage, as insulators, that they give no "static" shock in cold, dry weather, which is often an annoyance when metal knobs are employed. There is, of course, the added advantage that no applied finish is required.

Many other plastic applications have gained popularity and their number is increasing daily. Plastics are also gaining favor in the industrial field; their use in this respect will be the subject of a later article. At least it is evident from the foregoing that many real advantages may accrue from the intelligent combination of plastics and metals.

Screw Machine Replacement Market in Ohio Is Large

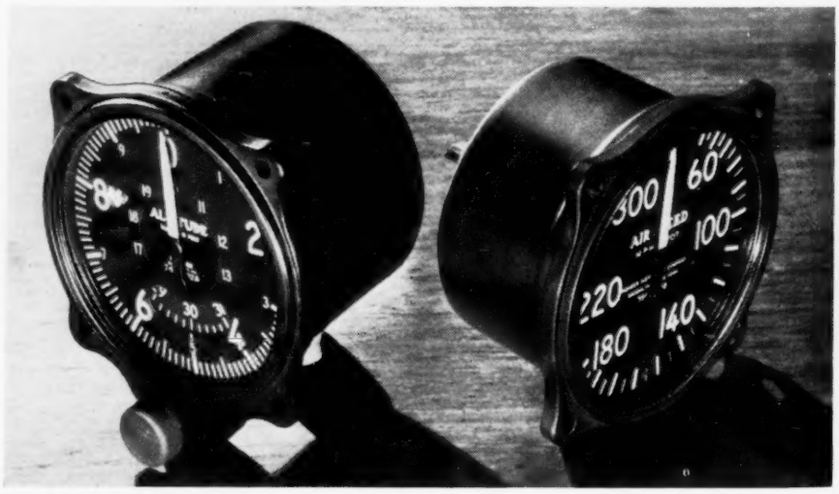
A survey conducted by National Acme Co., Cleveland, discloses that in the state of Ohio alone are 943 automatic screw machines of this company's manufacture and all more than 15 years old. Not only because of their use in the intervening years but also because of the changes in design and construction that are featured in modern machines, every one of these machines is regarded by the company as being entirely obsolete.

Assuming that one modern machine would take the place of two of these old machines, says the company, it is evident that there is a replacement market here for 471 new automatic screw machines. Production costs on practically every one of these automatic screw machines are entirely out of line with what is possible with new machines. To replace even half of this number of automatic screw machines would tax the company's manufacturing capacity for a year and a half, even if no business were handled for its customers in other parts of the United States or abroad.

Toolroom Grinding Wheels Meet Varying Needs

Carborundum Co., Niagara Falls, N. Y., announces two new toolroom wheels. One, known as Aloxite AA, has aluminum oxide grain combined with the new 170 bond, with a balanced grain bond structure and is said to be remarkably free cutting; because of the unusually low bond interference less grinding pressure is needed and increased production results. It is recommended for its flexibility which permits taking light or heavy cuts with low wheel wear; it also is intended for use on a wider range of steels. It is white in color.

The other, blue in color, is a new 270-bond wheel fabricated from a new type of aluminum oxide abrasive combined with the new 170 bond. It is for production purposes in the toolroom, such as grinding duplicate parts, where flexibility in the wheel is not so essential. It is said to be fast, clean, cool cutting and long lived.



Aircraft instruments with cases molded from shock-resistant Durez, which is light in weight, requires no applied finish and does not corrode

METHODS AND MATERIALS

Tracings Are Reproduced On Tracing Cloth

A service whereby drafting room tracings may be reproduced in any desired number on tracing cloth instead of on blueprint paper is offered by the Litho tracing reproduction method used by the Lake Photoprint Co. Inc., 19 South Wells street, Chicago. Copies usually are made from the original tracing but can be reproduced from the master drawing if the lines are sharp and clear.

Cost of the reproductions is 50 cents per square foot and usually represents a considerable saving over the cost of preparing additional tracings by hand, particularly in the case of complicated and highly-detailed drawings. The reproductions may be used for reference and the originals filed for safe keeping. Reproductions are identical with the master tracing in clarity and are non-smearing and non-shrinking. Equipment of the Lake Photoprint Co. will handle any of the usual sizes of tracings.

The process consists of exposing to bright light a sensitized paper in contact with the tracing which is to be duplicated. The former then is pressed on a table covered with a gelatine-like substance to which the details of the tracing are transferred from the paper. When the impression is inked the desired number of copies may be printed from it.

$ $ $

Resistance Alloy Operates At 2462 Degrees Fahr.

A new electrical resistance alloy for use at operating temperatures as high as 2462 degrees Fahr. has been developed by C. O. Jelliff Mfg. Corp., Southport, Conn. Known as Kanthal, it may be used without protective gases and possesses remarkable resistance to oxidation. It is particularly free from attack in the presence of sulphur. It is furnished in one grade which operates at 2462 degrees Fahr; this is for electric furnaces. Another grade for domestic appliances is good at temperatures up to 2372 degrees Fahr. A third grade is furnished for use with temperatures up to 1150 degrees Fahr. The company has compiled a booklet discussing the characteristics of these alloys.

$ $ $

Announces Deoxidizer for Iron and Steel Foundries

Niagara Falls Smelting & Refining Corp., Buffalo, announces a deoxidizer and antipiping compound for iron and steel foundries. It contains no carbon or metallic silicon and therefore will not alter the analysis of the metal. The company recommends its use only in large castings, having heads and risers 12 inches or more in diameter. Known as Bruinella E-1, the new compound is said to permit reduction of the size of heads and risers by 50 per cent.

Advantages claimed are reduction or elimination of cavities and porosity; reduction in feeding of the heads; the maintenance of greater fluidity in the molten metal during cooling; a resulting finer, closer grained structure without any increase in hardness. Use of this powder is said to make for greater machinability and to enable castings to stand up under higher pressures.

$ $ $

Announces Humidified Buffs

Humidified buffs are announced by the Udylite Co., Detroit. Every piece of cloth entering into the construction of these buffs is treated by a special humidifying process to bring the moisture content up to the

Iron Pea Graders

WHEN YOU EAT PEAS FOR DINNER, the chances are that they have been graded by equipment similar to that shown in this illustration. The seven pea graders shown are part of an installation of 10 such units furnished by the Rusk County Hardware Co., Ladysmith, Wis., to the Stokely Brothers Canning Co., Ladysmith. For fabrication of these units, American Rolling Mill Co., Middletown, O., furnished 2000 pounds of sheets. Dark patches shown on the cones are the grader screens

proper point for maximum tensile strength. The company states that buffs so made perform better and wear longer. The new buffs are made in all types, sizes and with any sewing.

\$ \$ \$

Improved Boiler for Low Pressure Heating Systems

Kroeschell Boiler Co., Racine, Wis., has developed an improved type of steam boiler for low pressure heating systems. It may be used for burning anthracite or bitmuinous coal, natural or commercial gas or oil. It is designed for triple pass fire travel which carries the gases three times the length of the boiler, resulting in high boiler efficiency and low exit flue temperatures. It has a large firebox and large liberating area, insuring production of dry steam. The water line is above the top row of fire tubes leaving the liberating area entirely free from obstruction and resulting in an extremely steady water line; this design provides large steam storage capacity. Grates are arranged to shake in two or four sections, an advantage particularly in mild weather since it facilitates keeping a slow fire. The boiler is of welded steel construction and is designed for hand or stoker firing.

New All-Welded Construction System Is Applied to Small Tankship

STUDERUS, a small oil tanker for harbor service recently completed by United Dry Docks Inc., 11 Broadway, New York, is the first vessel to be built on a new system developed and patented by Johannes Kjekstad, consulting welding engineer for that company. It is the third patented system of all-welded ship design developed by Mr. Kjekstad, the other two being his truss-weld and reverse channel systems.

The "free flow frame system," as the new design is designated, achieves high structural efficiency, inherent strength, flexibility and economy of material, as indicated by official tests made here and in Norway. The first tests were conducted last summer at the Staten Island plant of United Dry Docks, under the supervision of Messrs. Wilson and Walker of the American Bureau of Shipping. The results indicated that the new system has a 27 per cent higher structural efficiency against deflection and a 14 per cent less permanent set. Similar results were recently obtained by the Oslo Material Proveanstalt, a Norwegian testing institution, where a series of comparative tests showed that the free flow frame design is capable of sustaining a load 53 per cent greater than that sustained by a riveted frame of the same weight and a load 30 per cent greater than that sustained by an ordinary welded frame.

While the free flow frame system is well adapted to the construction of tankers and liquid cargo carriers generally, especially the larger hulls, its incorporation in any type vessel would seem to be fully justified by greater strength, lighter weight, and ease of maintenance, repairs, and cleaning or painting.

The new form of construction, according to the inventor, is "a system of 'open' framing in which the strength members are not directly attached to the shell plating, in the customary manner, but instead are so placed as to leave a space of some two inches between the outer edge of the frame and the shell. The effect of this 'open' framing is to increase the section modulus and the strength factors by placing the neutral axis of the frame shape at a greater distance from the shell plating; in other words, it operates to increase by so much the depth of the frames.

"When it is considered," the inventor continues, "that the weight of the frames, including beams and stiffeners, may represent as much as 30 to 50 per cent of the total weight of the hull, improvements in that part of the structure assume major proportions. Official tests, indicate that there may safely be a reduction of about 20 per cent in the weight of frames and stiffeners, when attached in the manner specified in the pending 'free flow frame' patents. This saving, of course, may be utilized either in heavier shell plating, in lower total weight, or in greater cargo capacity with the same displacement.

"Greater strength and lighter weight, however, are but two of the important factors to commend the free flow frame design. Valuable characteristics from the production and maintenance points of view also are disclosed by the tests conducted under American Bureau of Shipping supervision.

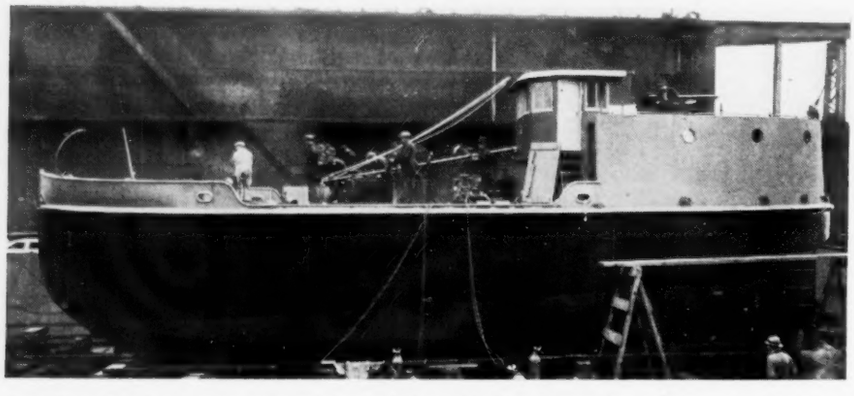
Stresses Not Detrimental

"Obviously, detrimental stresses and distortions simply do not exist where the shell plating is heated hardly at all, because the welding area is confined to lugs, spaced at comparatively wide intervals. In the tests referred to above under American Bureau supervision the channel framing was two inches from plating and was connected to it by 4 x 4 x ½-inch T-bar clips spaced 24 inches.

In the matter of maintenance, too, the benefits are of a practical and attractive kind. Unlike the ordinary framing, continuously attached to the shell, the free flow frame system offers no hiding place for corrosion to start, no gas pockets, no sludge panels, no place that may not be easily and thoroughly cleaned or painted.

From the repair point of view, the free flow frame system affords distinct economies, it would seem: In the event of damage, either the plating or the framing may be repaired or removed, each without disturbing the other.

The STUDERUS, shown in the accompanying illustration, was built at the Crane Twenty-seventh street plant, Brooklyn, of United Dry Docks Inc. for Studerus Transportation Co. Inc., Kearny, N. J. She has overall length of 64 feet 7 inches; molded breadth of 21 feet and molded depth of 10 feet. She has capacity for 40,000 gallons of gasoline and light oils.



Small tanker built on a new system of all-welded construction whose principal feature is that the framing is set off from the shell plating by some 2 inches and is secured to it by welded lugs at regular intervals

Air-Acetylene Method Is Widely Used When Low Temperature Flame Is Needed

POPULARITY of the air-acetylene flame as a supplement to the oxy-acetylene process continues to be demonstrated, indicating almost immediate acceptance of this tool, says *Oxy-Acetylene Tips*, published by Linde Air Products Co., New York. This popularity is due to the fact that the air-acetylene method provides a small, intense flame that is easily controlled. It is adaptable to an almost unlimited variety of applications requiring a somewhat lower flame temperature than provided by the oxy-acetylene flame.

Possibilities Are Suggested

Within recent months several outstanding examples of the efficiency of the air-acetylene flame in new fields have been developed, and they suggest possibilities to other manufacturers. A nationally known company is making wide use of the air-acetylene flame in production of many kinds of dairy and farm equipment, and also in plant maintenance and equipment servicing operations. One of the principal items manufactured is a 200-gallon milk pasteurizing chamber shown in an accompanying illustration. The nature of this piece and the materials used are such that it is conveniently fabricated with soldered joints. The seams of the chambers are all soldered using the air-acetylene flame soldering iron. The heavy 3-inch coils used in the interior of the chambers are also assembled with this apparatus. The piping and many of the fittings in these chambers are likewise applied with soldered joints.

On another job the enclosed air-acetylene flame soldering iron is used in the fabrication of a small ice cream storage container made of galvanized sheet. These containers are produced in large quantities and the soldered joints stand up very well indeed for this purpose.

Milk coolers for farm use form another large production item. These are made of copper, and the joints and braces are all made with the air-acetylene flame. Copper-lined sanitary milk pipe is assembled with fittings by means of soldered joints.

The usual maintenance applications found suitable for the application of the air-acetylene flame are also carried out in this plant rather extensively. The removal of frozen and rusted bolts, bearings and shafts on various pieces of machinery such as milk bottle fillers is a common application.

Use on Large Printing Press

Some of the machinery manufactured by this concern, such as "single roll" churns for the creamery industry, is maintained and serviced in the customer's plants. Service men are provided with air-acetylene flame equipment for use in their routine work in the field.

An interesting application involved the use of the air-acetylene flame in the installation of a huge set of new printing presses in the plant of a large newspaper in one of the central states. The installation contains 32 press units, including color units and folders, and is the equivalent of two city blocks in length. It is the first high-speed, anti-friction, automatic oil force feed job ever built.

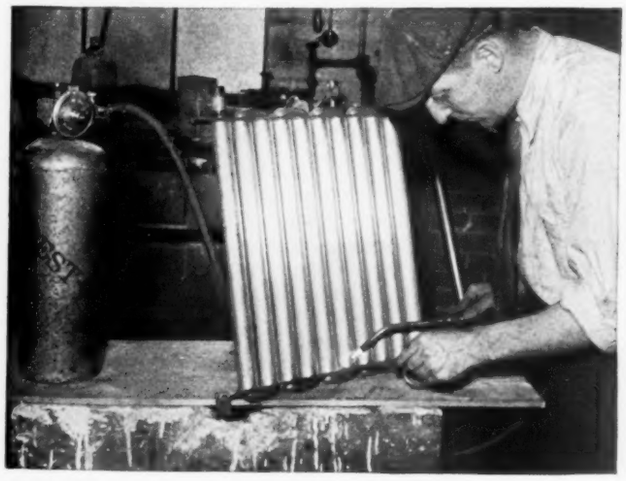
The manufacturer employed the air-acetylene flame not only in building the presses, but in actual erection in the newspaper plant. The automatic oil force feed feature means that hundreds of feet of small diameter copper tubing are necessary for the lubrication system of each press. An idea of the extent of the piping involved can be realized from the fact that each unit has about 700 of the so-called sweat-type fittings, varying from ⅛-inch to 1⅝ inches in size. The air-acetylene flame was used extensively in making the joints.

Annealing Copper Tubing

Another important use of the flame was in the annealing of the copper tubing, a great deal of which had to be done for the proper bending of the tubing for perfect fitting, especially in the actual installation of the presses.

Still another use of the air-acetylene flame is in paint removing. The curved stem of the paint burner can be nudged into every nook and crevice. The flame is spread in a sheet the width of which may be varied from ½-inch to 3 inches. It softens the surface and as the paint peels off the operator removes it with a sweep of the scraper. Control is such that extremely exacting work is possible. Any portion of the paint can be removed while leaving adjacent surfaces unharmed by simply protecting them from the heat by a piece of sheet metal or asbestos material.

For types of work formerly done with an old fashioned soldering iron heated in a charcoal brazier or by a gasoline blowtorch an air-acetylene soldering iron is a useful modern tool. This is the type used by the dairy mentioned above. The flame is entirely enclosed within the tip of the soldering copper. It supplies an



Soldering of tinned-copper tubes for milk coolers is illustrated at left, an air-acetylene torch outfit being used. At the right is shown the use of an enclosed flame air-acetylene soldering iron in soldering coils and seams for pasteurizing chambers

even, continuous heat and operates efficiently in wind or under severe weather conditions. No preheating is necessary with an air-acetylene soldering iron.

Motor repair shops in the maintenance departments of large plants find many uses for an air-acetylene soldering iron outfit. One railroad shop uses this for soldering leads in the commutators on the armatures of traction motors. It saves more than half of the time required for this work by an old-fashioned soldering iron.

Where a small evenly controlled flame of this type is required, use of the air-acetylene flame is advantageous. With this as a supplementary tool to the oxy-acetylene outfit the range of useful applications in any plant can be greatly extended. Where the high temperature oxy-acetylene flame would be too hot, the relatively lower heat of the air-acetylene flame is desirable and economical.

\$ \$ \$

Wet Molding Sand Causes Blistering of Enamel

A manufacturer recently encountered blistering trouble in porcelain enameling high cast-iron shelf brackets of very thin sections. The blisters invariably appeared along the thin sections. It was agreed that the difficulty was not in the enamel shop, thus the investigation turned to the foundry.

It was found that the castings were poured at the extreme end of the floor near a water trough where the molders dipped buckets of water. Each time water was dipped, some of it was spilled on the sand used in making the bracket molds. Therefore, the molding floor was moved nearer the cupola and away from the water trough, with the result that no more trouble was encountered.

\$ \$ \$

Economies Are Effected Through Bright Annealing

With the installation of a continuous, mesh-belt type, electric furnace for bright annealing steel stampings between draws, a midwestern manufacturer of nameplates, radio dials, refrigerator hardware, emblems, and similar products, has made four important savings. Since all parts come out of the furnace clean and bright, no pickling is required between drawing operations. Because the furnace has good temperature distribution, all parts are annealed uniformly; this results in a smaller number of rejects and minimizes wear and tear on dies. It is said also that the dies make stampings with clearer-cut impressions.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Storming the Ramparts

A VISITOR to the Machine Tool Show expressed surprise to find so many of the welding fraternity at work there. Welding and cutting machines, methods and supplies were greatly in evidence.

Let's get this straight. Every industry that works in metal is finding welding men climbing over its fences. They come because they are looking for better ways to do jobs. They have applied welding to thousands of jobs so that manufacturers could turn out a better product for less cost. To name these jobs would cover every page of this magazine with fine print and still leave much untold. In the machine tool industry the list would include press frames, planer beds, grinder frames made of rolled steel welded together. Pans, gear covers, jigs, fixtures have gone over to welded construction.

There are eleven separate and distinct welding processs. In addition, flame cutting is generally considered as a part of the welding industry. The business of cutting and fastening pieces of metal together is fundamental. It is the basis of all metalworking industry.

The year 1935 is witnessing the storming of the ramparts of the steel producing industry itself by the welding men. No practice or method is sacred because it is old. The very fact that welding has been applied so widely among the users of steel compels change and adaptation on the part of the steel producers. But that is just the beginning. The very processes by which steel has heretofore been made are being scrutinized by welding men to see where they can be improved.

The battle is on; may the devil take the hindmost.

* * *

Many engineering colleges are showing interest in the matter of training men who will be useful to industry in welding. A prerequisite for such training is thorough grounding in mechanical engineering, metallurgy and mechanics. But all of these subjects, practical as they are, need to be brought to a focus through actual skill and experience in the craftsmanship of welding. We do not think good welding men can be turned out with a two-hour-a-week course lasting one semester or term. It should be made a four-year professional course with half of it shop and laboratory work.

Sparks and Flashes

A practical problem in probability may be stated as follows: In a certain welding operation, a single bead of weld metal applied by the arc process, using shielded arc welding rod, will have a discontinuity resulting in a leak under pressure once in 121 feet of bead. The discontinuity will not be more than $\frac{1}{4}$-inch long or more than 1/16-inch wide but may come at any place in the bead. Problem: If one bead is applied over the top of another bead (a two-bead weld) what is the probability of a pressure leak. (Correct answer will be furnished to those sending self-addressed envelope.)

* * *

In a newly invented head shield for arc welding operators the protective glass may be raised by the operator giving a hard "poof" of breath on a trigger. He closes it by the same means. The inventor overlooked the fact that many good welding operators chew tobacco and anything like a "poof" would result in his spitting possibly a pint of tobacco juice back into his own face. Some of these head shields equipped with radio, air conditioning and head rests will have to wait until we have progressed further in the welding craft.

POWER DRIVES

Supervising Drives

SUPERVISION, maintenance and responsibility for industrial transmission equipment should be centered in some particular individual or department. For good management, authority should be delegated with responsibility. Industrial practices do not always agree on the individual or department which should have this responsibility and the load it shoulders.

As transmission originally connected direct with the engine or water-wheel the chief engineer naturally assumed jurisdiction in the early days of industry. Transmission then consisted of belts, ropes, gears and pulleys, with quills and clutches added to make it interesting.

With the growth of modern industry came the development of motors and the segregation of the engineer to the supervision of economical production of power and heat, or, in more recent developments, his elimination when power is purchased. The addition of electrical drive units, their control equipment and distribution facilities has required placing the responsibility for transmission on a man with an entirely new type of knowledge and training. In some plants he became subordinate to power generation; in others he became a part of the production department. In still a third type of plant he was given responsibility for breakdowns and repairs but no actual authority over the equipment. His lot was none too satisfactory under either of the first two conditions but was positively intolerable under the third.

Authority Not to Be Abused

Today many modern industrial plants place transmission and its servicing under the general supervision of the plant or works engineer, master mechanic, or maintenance engineer. Under this arrangement the supervisor of transmission is entirely independent from production of power. His duty is to provide equipment which will supply ample power at the machine head and to inspect and maintain this equipment. He is responsible for that equipment and except under special industrial conditions, such as with continuous processes, has the authority to stop the drive and its machine even though to do so interferes with production, if thereby he can protect his drives from damage.

The wise transmission engineer, however, realizes that any executive uses authority with discretion and not merely to indicate its possession.

• • •

Usually it is not the power transmitted that wears out a belt but the heat generated through slipping, due to overloading or insufficient tension or to misapplications such as the use of a 2-inch belt when a 3-inch belt is needed.

• • •

Over Lubrication

Grease lubricated anti-friction bearings can be filled too full. This results in overheating and may increase the power consumption, thus defeating the purpose of the lubricant. Also, the excess pressure created within the bearing may affect the bearing seal. The danger of over filling is greatest where the lubricant is applied under pressure.

The difficulty of maintaining proper lubrication at time of renewal is increased since it is not possible to know how much grease is required without removing the bearing caps and inspecting. Some maintenance engineers do this periodically on a few of the bearings and thus determine the required frequency of renewal and the approximate amount of lubricant required. The oiler is then instructed to make a definite number of turns or strokes on the grease gun.

• • •

Moving Machines Quickly

Machines in the modern plant which are geared up for high speed quantity production do not always stay put. For example, a representative of STEEL recently visited a plant to talk over an article which the maintenance engineer was to write on some of his power transmission problems. In one department a battery of small presses was lined up in a somewhat unusual arrangement for the manufacture of a special part. Less than a month later STEEL's representative, arriving with a photographer, found this battery of about a dozen presses moved and split up into three smaller groups all set for most effective operation on entirely different products.

Such quick lay-out changes are not uncommon in many plants, especially in automotive plants and in other industries called upon to provide for numerous model changes. To facilitate such shifts of machines many transmission engineers favor individual drives with the motor and its control mounted on the machine.

By planning ahead in this way it is only necessary to mount the machine and connect up a conduit line. In some plants special distribution lines in "troughs" or box ducts extend throughout the plant so that only a short conduit line is necessary to get to a machine in any location.

• • •

Graphic Motor Records

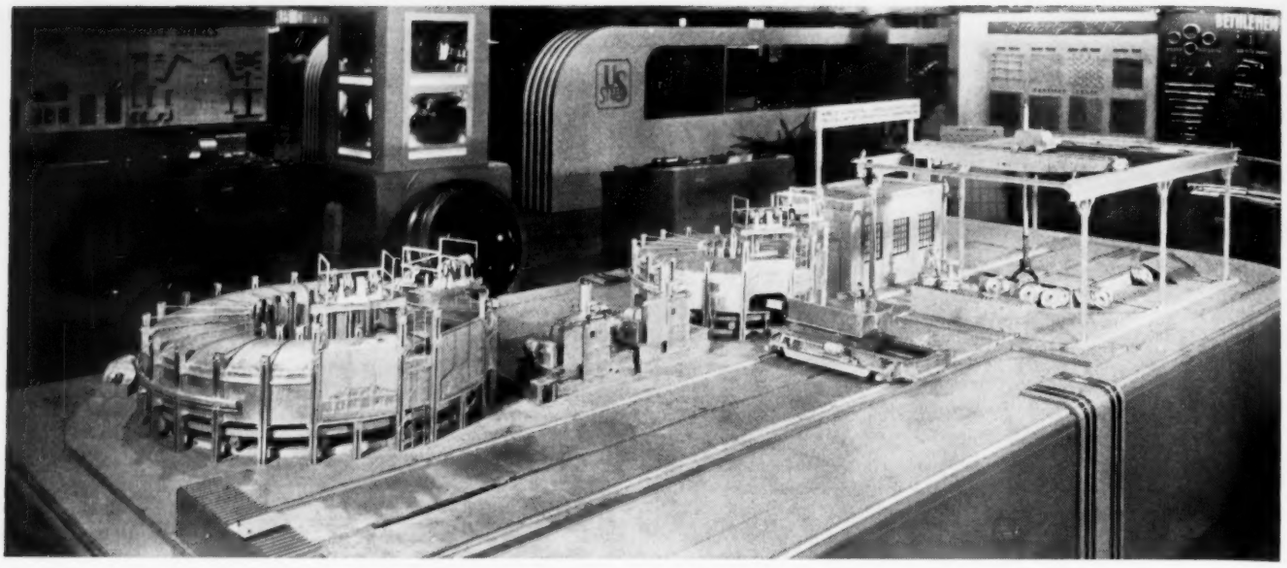
Graphic records of motor operation serve many valuable purposes. For example, a number of concerns record the power consumption of the motor when starting, under no load, and loaded on all new installations. These charts are studied to see if the installation is operating as expected and then filed.

Graphic charts taken at any time in the future, or when trouble is suspected, are compared with the original to see if any trouble has developed or if changing production requirements have overloaded the motor. Often drive troubles are indicated on the chart when no other visible signs may be seen. Damaged gear teeth, worn pulleys, excessive misalignment of the flexible coupling, faulty motor and control operation, shaft misalignment, worn clutches or bearings, are only a few of the items of faulty operation which have been disclosed in this way. Of course the chart does not always indicate where the trouble lies but it does show that something is wrong. A careful study of the cycle, whether the difficulty is continuous or repeats in cycles, and if so, the length of the cycle, are some of the factors to be considered.

Still another application of graphic records is that they permit a careful study of the time cycle of a machining operation in production. Curves of a day's work or even of a half dozen cycles are generally more accurate than time studies.

• • •

Production requirements should be given first consideration when selecting the type of drive and conversely the drive should be adapted to the production methods and equipment.



Bethlehem Steel Co. exhibited a working model of its automatically controlled car wheel heat treating plant at its Cambria works in Johnstown, Pa.

National Metal Show Reflects Marked Advance in Materials and Methods

(*Continued from Page* 16)

ed a machine for straightening and polishing round bars or tubes.

♦ ♦ ♦

Rumbling of mill rolls at the booth of the Youngstown Sheet & Tube Co. Slabs of lead actually being rolled on a continuous modern continuous broad strip mill in miniature showing in scale size the company's recently completed wide strip mill at Campbell, O. Actual reductions were made on the piece as it ran the gamut of mill rolls. What the critical eye was unable to discern about the mill from the model could be scanned from colored photographs illuminated in the background.

♦ ♦ ♦

A magnet which drew attention to the exhibit of E. H. Sargent & Co., Chicago, manufacturer of laboratory equipment, was a complete copy of and framed illustrations from "De Re Metallica," written by Georgus Agricola in 1556 *and translated in* 1912 *by former President and Mrs. Herbert Hoover.*

♦ ♦ ♦

One of the finest displays ever seen in National Metal expositions was that of Union Carbide & Carbon Corp. and its various subsidiaries. The front elevation of the exhibit measured 67 feet wide by 28 feet high, a wide panel across the top being in the nature of an industrial panorama in colors and illuminated from the rear. This panel was surmounted by the company's name and at its center was a model of an electric furnace which stood out from the panel in relief.

Entrance to the exhibit was below the top panel, the central feature being an oxyacetylene shape cutting machine. At regular intervals demonstrations of various types of welding operations were performed at the request of visitors.

♦ ♦ ♦

"Steel and Tools" was the title of a "movie" which attracted many visitors to the booth of Crucible Steel Co. of America. The scene showing the interior of an electric furnace, where the molten metal looked like the sunset-lighted surface of a troubled ocean, with black thunder clouds overhead, was unusually effective photography.

♦ ♦ ♦

One half of a large cast steel housing for a navy department installation revolved slowly at the booth of Sivyer Steel Casting Co. Visitors were asked to guess its weight. Nearest guess to the actual weight was to be awarded a valuable wrist watch late Friday night. As usual in these "contests," guesses ranged all the way from 50 pounds to a couple of tons.

♦ ♦ ♦

Pacific Coast visitors to the Metal show included F. B. Drake, president, Johnson Gear Co., San Francisco, and a former director of the American Society for Metals; G. Henoch, Continental Can Co., San Jose, Calif.; A. C. Delevanti, secretary-treasurer, Rich Mfg. Co., Los Angeles; Karl Strobel, president, Karl Strobel Corp., Los Angeles; B. Reinhold, president, Abegg & Reinhold Co., Los Angeles; and W. F. Stoody, president, Stoody Co., Whittier, Calif.

♦ ♦ ♦

A midget front-drive automobile was set up in the center of the General Alloys Co. booth. It had a 4-cylinder Austin engine, 85-inch wheelbase, single seat, independent springing and an instrument board crammed with rows of dials. All parts were painted in bright colors. Body had been left off to reveal the mechanical details. The company also showed a complete selection of its heat, abrasion and corrosion-resisting alloys.

♦ ♦ ♦

A demonstration of spraying molten metal was the center of interest for visitors to the booth of the Metallizing Engineering Co., Inc. A metallizing unit or spray gun, mounted on the tool carriage of a lathe, deposited metal on a revolving bar. Alternate layers of high carbon steel, copper, and other metals were sprayed on and the bar later was cut into discs to show the structure of the built-up section.

♦ ♦ ♦

Fifty-four large photographs of furnace installations for all types of heating and heat treating work made an interesting background at the booth of Electric Furnace Co.

♦ ♦ ♦

The sound of a locomotive whistle was heard many times at the show. Not a real locomotive whistle but a miniature blast that drew the attention of the visitor in the vicinity of the Columbia Tool Steel Co's. booth. There in the background, chugging away was a good size model of a freight train with the

driving wheels on the locomotive turning away for dear life. Following the locomotive came a carload of Swedish iron, Swedish pig, and various alloys which are used in the manufacture of high-speed steels. Then followed a carload of various shapes produced by the company and finally the caboose. The train, about 15 feet in length, established in the visitor's mind the fact that the company makes tool steel.

♦ ♦ ♦

Spencer Turbine Co. this year again supplied low-pressure air for all furnaces requiring it at the show. A large turbocompressor turned out 1300 cubic feet of air per minute at 1-pound pressure. The company also operated another turbocompressor which balanced an 8-inch leather volleyball in the stream of air which it directed vertically from a special nozzle. The ball whirled apparently unsupported in mid-air, about 2 or 3 feet from the end of the nozzle.

♦ ♦ ♦

Model makers are to be commended for their skill in producing on a scale of 1/12 the steel car wheel heat treating unit operated by Bethlehem Steel Co., Cambria works, Johnstown, Pa. At the company's booth was seen a miniature charging machine which gripped a wheel in its tongs, moved it into a rotary hearth furnace and later withdrew it in a heated state. As the charging machine advances toward a quench house it automatically turns the wheel upside down and then places it in a quencher. The wheel in a darkened state is withdrawn and charged into a rotary hearth drawing furnace, finally being deposited by the charger on a rail type table. From here a traveling crane picks up the piece and moves it toward the rear, finally depositing it in the cooling pits.

The company also showed a working model of a high-temperature furnace preparatory to quenching steel bars for grain refinement and hardening. The unit included a preheating furnace, a high temperature furnace and a quench tank.

♦ ♦ ♦

A large, colored portrait of Andrew Carnegie was the central object in the booth of Case Hardening Service Co. It was set off sharply by series of colored lights and other decorations. The late Mr. Carnegie looked down sternly on the company's products grouped around the exhibit—anticarburizing paint and other supplies for the heat treating department.

♦ ♦ ♦

"Firewater" (but not the drinking kind) drew the attention of visitors to the booth of C. M. Kemp Mfg. Co. A special industrial carburetor premixed air and city gas which was subsequently burned beneath the surface of a tank of water. Practical application is submerged combustion for heating pickling tanks.

♦ ♦ ♦

One of the newest machines seen at the show was an electric arc metal saw, the invention of Karl Strobel, which was exhibited by the Rich Mfg. Co., Ltd., Los Angeles. The circular saw itself acts as one pole and the work table the other for a low voltage, high amperage current. In sawing, a controlled electric arc leaps ahead of the saw teeth, heating the metal along the kerf lines to a plastic state. The saw blade sweeps the molten metal from between the kerf lines. The teeth do not cut. They give impulse to an oscillation of the current through a lengthening and shortening of the arc, which stabilizes and directs the path of the arc so that side arcing is eliminated and the path of cut is only a few thousandths of an inch wider than the thickness of the saw blade.

♦ ♦ ♦

Out of a Timken ladle comes the dawn of a new day for users of alloy steels. This slogan came continuously from a replica of a steelworks ladle shown in the background at the Timken Steel & Tube Co.'s booth and it terminated in the midst of an illuminated photograph of one of the company's electric furnace.

♦ ♦ ♦

Attending the Metal exposition from remote parts of Canada were P. C. R. Banting, superintendent, Richardson Production Machinery Co., Saskatoon, Sask., and Prof. J. F. Cunningham, University of Manitoba, Winnipeg, Man.

♦ ♦ ♦

Animated displays showing savings effected through installation of Babcock & Wilcox insulating firebrick in industrial furnaces drew considerable attention. By clever arrangement of illuminated charts, tied in with illuminated selling points in print, an effective demonstration was provided.

♦ ♦ ♦

Sharp explosions and flying sparks were the only things lacking at the booth of the Jones & Laughlin Steel Corp. to make the blooming of an ingot realistic. For here a good sized working model of the company's bloomer took an ingot from the soaking pit and converted it into a slab in several passes. And all the trimmings were shown from the manipulators moving the ingot in line with the desired pass to the tilter turning the ingot before it entered the rolls.

Another view of the exhibits in the main arena of the International Amphitheatre in Chicago

Society for Metals Discusses Metallography and Research

TWO technical sessions opened the annual convention of the American Society for Metals in Chicago, Monday, Sept. 30.

The metallography session was started with a paper prepared by Dr. F. F. Lucas, member of the technical staff, Bell Telephone Laboratories, New York, describing the preparation of iron and steel specimens for microscopic investigations. The author stated that a given lens system has certain potential resolving powers, and these powers may or may not be fully realized in practice.

If one hopes to achieve the utmost in resolving power, said Mr. Lucas, the preparation of the specimens becomes of major importance.

As to the mounting and size of specimens, Mr. Lucas stated: "Perhaps the best general practice is to mold the specimen in bakelite when circumstances permit. Bakelite mounting, in my opinion, is superior to all other methods of mounting, except when the temperature of bakelite molding is detrimental. For example, if one wished to study the 'as quenched' structure of a hardened steel, the temperature necessary to mold bakelite would temper the specimen and profoundly alter the 'as quenched' condition. Otherwise, everything appears to favor the bakelite method.

Etching Corrosion Resisting Alloys

"The ideal specimen is one about ¾ to 1-inch diameter without mounting media of any kind. The height of the specimen should not be more than ½-inch, otherwise difficulty will be encountered in maintaining a flat surface. For smaller specimens the height should be proportionately less. Specimens ½-inch or smaller in diameter should be mounted or blocked."

An electrolytic method for etching corrosion-resisting alloys which has proved very useful was described in a paper by George A. Ellinger, assistant metallurgist, national bureau of standards, Washington. Several advantages of the method were cited, including: 1—It reveals both carbides and grain boundaries in most alloys of the 18-8 type, after suitable etching periods; 2—it is reasonably rapid in action and is not dangerous to use; 3—it affords a means for studying structures at higher magnifications; 4—specimens do not stain after use but remain bright and may be examined months after preparation; and 5—it affords an excellent medium for the etching of materials of different origin and treatment in the same specimen such as are found in welded joints.

The solution generally used, explained Mr. Ellinger, contains 10 grams of oxalic acid dissolved in 100 milliliters of distilled water, which may be diluted if desired for specific purposes. The polished specimen is made the anode and a piece of platinum gauze the cathode, the two being about 1-inch apart. Current from a 6-volt storage battery or from 4 dry cells connected in series is passed through the cell.

Suggest Nomenclature Changes

Carbides are revealed in the 18-8 type of corrosion-resisting steels by 15 to 30 seconds etching, and additional etching, 30 to 45 seconds, will reveal the grain boundaries as well without serious over etching of the carbides. Etching by this procedure for carbides and grain boundaries, it was said, does not result in pitting out of the inclusions.

In the morning session's final paper, "On Naming the Aggregate Constituents in Steel," contributed by J. R. Vilella, G. E. Guellich and E. C. Bain, United States Steel Corp., New York, some 20 photomicrographs were employed to illustrate and classify, from the structural standpoint, the modes of transformation of austenite and the tempering of martensite in carbon steel. These structural types are considered genetically and a simple basis of nomenclature is set forth.

The authors proposed that the word "pearlite" be applied to all the lamellar (ferrite and carbide layer) structures formed directly by nodular growth from nuclei in the austenite at comparatively high subcritical temperatures, and that the word "sorbite" be applied to tempered martensite structures. If the word "troostite" is to be maintained, it should be applied preferably in such a way as to introduce no ambiguities or confusion; at the present a suitable category for troostite is not apparent though some possibilities not wholly logical are mentioned. The word "spheroidite" was suggested to designate the more coarsely spheroidized carbide structures.

Dropping of the word "troostite", concluded the authors, would clearly cause no great hardship and at the same time its use permits the possibility of ambiguity unless it be definitely assigned to some arbitrarily limited range of a continuous series, at least a highly artificial means of preserving its use. In conclusion, it was suggested that (1) pearlite apply to all lamellar structures in steel formed by direct nodular transformation and that (2) sorbite apply only to tempered martensite. If troostite is to be maintained, it might apply either (1) to the slightly tempered martensite or even, though less satisfactorily, (2) to the particularly fine lamellar pearlite associated with martensite in the not quite fully hardened zones of quenched steel, but certainly not to both.

A paper on arc welding of high-carbon and alloy steels by T. N. Armstrong, assistant metallurgist, Norfolk navy yard, Portsmouth, Va., opened the afternoon session on research. In the absence of the author, the paper was presented by L. C. Bibber, bureau of construction and repair, navy department, Washington. In welding these classes of steels by the arc process, the heat from the arc causes formation of a hardened zone in the base adjacent to the deposited metal. Unequal cooling strains set up in the deposit and the base cause cracks to occur in this heat affected zone. Heating the base prior to welding prevents welding cracks but preheating does not appear to improve bending properties of the weld, and apparently affects impact properties in the base metal and in the weld adversely.

Discuss Weldability of Steels

According to the author, it appears that future efforts will have to be directed toward development of alloy steels that will be free from martensite in the affected zone on welding. Some progress already has been made in this direction, as several manufacturers are now offering low-alloy steels of low carbon content, but the strength is somewhat limited. It is probable that the answer will be found, not by limiting the carbon but by proper alloy combination.

P. E. McKinney, Bethlehem Steel Co., Bethlehem, Pa., discussed Mr. Armstrong's paper and agreed in general with the author's conclusions. However, he pointed out that there is considerable difference of opinion on the question of weldability of high-carbon and alloy steels. Weldability in its broadest sense covers a very wide field and it is unsafe to class any material as definitely weldable or unweldable without some consideration of the service applications which are contemplated for the welded parts.

Even in the case of high-carbon and alloy steels which are very definitely air-hardening, he stated, welding is entirely safe and practical for

building up hard wearing surfaces in some parts of equipment which are not subject to severe service stresses which would be influenced by the affected underlying zone. It is quite obvious, however, that where such disturbance occurs in all of the physical characteristics of the material surrounding the weld as is shown by the author in these instances, any application of the welded part to service where these characteristics are essential, is a hazardous undertaking.

Concluding, Mr. McKinney declared there is a wide field for further investigation in the development of high-strength alloy steels which are capable of being welded with development of a hard brittle zone surrounding the weld and at the same time capable of developing the physical properties in service. Further investigation may indicate that certain stabilizing additions may be beneficial but this certainly has not been proved up to the present time.

Study Changes in Graphitizing

"Some Transient Phase Changes During the Graphitizing Reaction" was the title of a paper prepared jointly by H. A. Schwartz, manager of research, and H. H. Johnson and C. H. Junge, members of research staff, respectively, National Malelable & Steel Casting Co., Cleveland. Using certain data and material furnished by Cyril Smith and E. W. Palmer, American Brass Co., Waterbury, Conn., the authors attempted to follow the changes in composition and specific volume of the cementite and solid solution phases during the process of graphitization in the light of their own metallographic and density investigations.

It appeared that material partially graphitized at 1700 degrees Fahr. is converted on cooling and holding below A_1 into graphite plus Fe_3C plus decomposed solid solution (granular pearlite) of approximately metastable eutectoid composition. At the elevated temperature, however, the cementite decreases in density; the latter remaining a simple function of the former. The stable solid solution saturated at 1700 degrees Fahr. is less dense than the saturated metastable solution by about 1 per cent.

A paper, "A Dilatometric Study of the Alpha-Gamma Transformation in High Purity Iron," by C. Wells, R. A. Ackley and R. F. Mehl, metals research laboratory, Carnegie Institute of Technology, Pittsburgh, concluded the afternoon session. In this research, a dilatometric study was made of the alpha-gamma transformation in high purity iron, using a newly developed, high-precision recording differential dilatomer.

Fundamental Research Sheds Light on Welding Problems

NITROGEN alone is not responsible for inferior properties found in some metallic arc weld metal. This conclusion, among others, was given in a paper presented by Dr. J. W. Miller, Reid Avery Co., Philadelphia, at the opening session of the American Welding society's fall meeting at Chicago, Sept. 30. It was the author's opinion that other factors, such as heat treatment, grain size, microstructure, carbon content, manganese content, cooling rate, etc., play an important part in controlling the physical properties.

This paper described results of a study of weld metal, covering also an investigation of the influence of various factors in determining the nitrogen content of the metal. Such variables included the nitrogen content of welding atmosphere, the carbon content of the electrode, the size of the electrode, and amperage and voltage employed.

From these tests Dr. Miller determined that the absorption of nitrogen by the weld metal may be diminished by increasing the carbon content of the electrode, increasing the amperage, decreasing the voltage, increasing the diameter of the electrode, maintaining a reducing atmosphere, using heavy coated electrodes.

Nitrogen absorption varies directly with the nitrogen content of the welding atmosphere, but the solubility of nitrogen in the weld metal appears to decrease with an increase of temperature at the elevated temperatures of welding, according to the speaker. He also indicated that carbon monoxide and hydrogen largely are responsible for the blowholes occurring in weld metal with perhaps the assistance of hydrocarbons.

Reviews Status of Bridge Welding

Although the inception of the welded bridge may be considered as dating from about 1922, much that was known of welding technology, even four or five years ago, has been superseded and is out of date, it was pointed out by F. H. Frankland, technical director, American Institute of Steel Construction, in a paper on "Bridge Welding—A Review of the Literature." This review covers 61 studies representing the latest developments influencing welded bridge construction, dated from 1926 to September, 1935.

While until recently the greatest contributor to the engineering research in connection with welded bridges has been Germany, such research is spreading rapidly to other countries, particularly the United States and Great Britain. Mr. Frankland stressed the importance of the work of the bridge committee of the American Welding society and its forthcoming specifications covering design and construction.

Steel Better for Spot Welds

Difficulties in spot welding aluminum and duralumin make stainless steel a preferred material in the fabrication of light sections such as used in airplane construction, according to one opinion expressed in discussion at the two technical sessions devoted to fundamental research in welding. Seven papers were presented on topics under this classification, with H. T. Heald, dean of engineering, Armour Institute of Technology, Chicago, presiding at the morning meeting and C. A. Adams, director, American Bureau of Welding, chairman of the afternoon session.

"Spot Welding Problems," discussed by Prof. J. H. Zimmerman, Massachusetts Institute of Technology, Cambridge, Mass., included a description of tests on the spot welding of Alclad. Shrinks were found to occur at certain ranges of heat, while there was evidence of a pure aluminum coating around the welded section. In this connection N. F. Ward, University of California, Berkeley, Calif., pointed out that the embrittling effect in spot welding of aluminum or duraluminum limits their use in forming structural members and that in instances where light weight and high strength are required that stainless steel offers a more desirable medium.

Other spot welding tests described by Professor Zimmerman included a study of tip deterioration; a method for spot welding nickel steel plates; and experiments with the strength of various sections of stainless steel assembled by spot welding. In testing electrodes it was found that a decrease in pressure increased the number of welds obtainable before failure, and that while the total load increased with the welding pressure that the unit stress remained fairly constant.

A comprehensive review of various published reports on bend testing of welds was given by Prof. M. F. Sayre, Union college, Schenectady, N. Y. The basis of this review included many tests conducted abroad

as well as in this country, covering different methods of bend testing. Considerable information on this subject has been made available in Europe, and the speaker was of the opinion that correlation of this information rather than the conduct of additional tests is desirable. It is planned to make translations of such data available for use by the industry in the United States.

The structural steel industry should and must give closer attention to the advantage of welding individual members into a rigid unit if it is to meet the challenge of reinforced concrete construction, it was stated by Prof. Inge Lyse, Lehigh university, Bethlehem, Pa., in a paper on "Advantages of Welding in Continuous Structures." The problem facing the structural steel engineering is that of ascertaining how much restraint or rigidity may be counted upon in welded connections. The author showed typical foreign designs of rigid frame and bridge members in which substantial reductions in weight and cost were effected through use of welded construction.

Welding in Argon Atmosphere

Tests on direct-current welding of pure iron in an atmosphere of argon were described in a paper by Prof. Gilbert E. Doan, Lehigh university, Bethlehem Pa., in co-operation with H. F. Schulte, also of Lehigh. Welding wire of ⅛-inch diameter was used, in connection with a ¼-inch plate. Current varied rom 40-90 amperes. In an atmosphere of pure argon the arc was not stable; in argon of 97-98 per cent purity the arc was stable. No crater formation on the plate was noticed, and the arc spread over a fairly large area on the plate.

Effects of polarity and welding wire coatings were examined. The deposited metal showed 90 per cent reduction of area and 30 per cent elongation, using an atmosphere of argon; in air these figures were 3.5 per cent reduction of area and 4.5 per cent elongation. Melting rate was the same in both atmospheres.

Prof. R. E. Jamieson, McGill university, Toronto, Ont., described a series of tests on residual stresses in welded steel samples.

Further fundamental welding research was reported by Prof . W. M. Wilson, University of Illinois, Champaign, Ill., who described a series of interesting tests made to determine the feasibility of welding the steel frames of buildings for complete continuity. From the tests it was observed that several types of welded joints developed the full strength of the beam and therefore would be considered satisfactory for use in a welded building frame.

The first of an extensive series of creep tests on welds was detailed by N. F. Ward, University of California, Berkeley, Calif. The first tests involve low-carbon steels and it is planned to carry the tests forward on high-carbon and various alloy steels. The flow or creep of steel under extended periods of temperature and stress is a subject which has a very real practical value. One instance cited is the gradual loosening up of a bolt due to flow of the bolt metal. A number of variables are involved in setting up tests of creep. They include nonuniformity of the steel, variations in grain size, physical properties and residual welding stresses.

Wiremakers Discuss Cleaning Practice And Pickling Tank Construction

LACK of control of acid cleaning can weaken the chain of operations in taking steel through to the finished wire product and causes considerable grief F. A. Westphal, superintendent of wire mills, Sheffield Steel Corp., Kansas City, Mo., told members and guests of the Wire association at the opening session of its annual convention held in the Congress hotel, Chicago, Sept. 30 to Oct. 4.

On low-carbon stock up to 0.25 carbon the sulphuric acid bath may may be up to 180 degrees Fahr., he stated, and on high-carbon stock ranging from 0.30 to 0.85 per cent, it should not exceed 120 degrees Fahr. Temperature has a direct effect on acid brittleness and failure to carry the correct temperature also can result in a ferrous sulphate and carbonaceous smut on the surface of the steel, he cautioned, that is detrimental to subsequent drawing.

Acidity may vary from 3 to 8 per cent depending upon the type of stock being cleaned, the speaker pointed out. Experience and vigilence determines the time necessary for good cleaning and to meet the variables of this operation. Mr. Westphal emphasized that an excellent quality of lime positively is essential—one that is free from grit, dirt and excess silica.

The speaker was of the opinion that a straight layout is the more efficient and economical and it is adaptable for practically any acid cleaning, especially on the coarser sizes, say 1 inch diameter to 0.035-inch inclusive. In conclusion Mr. Westphal described the means of handling practiced at his plant, various steps and equipment being depicted by slides.

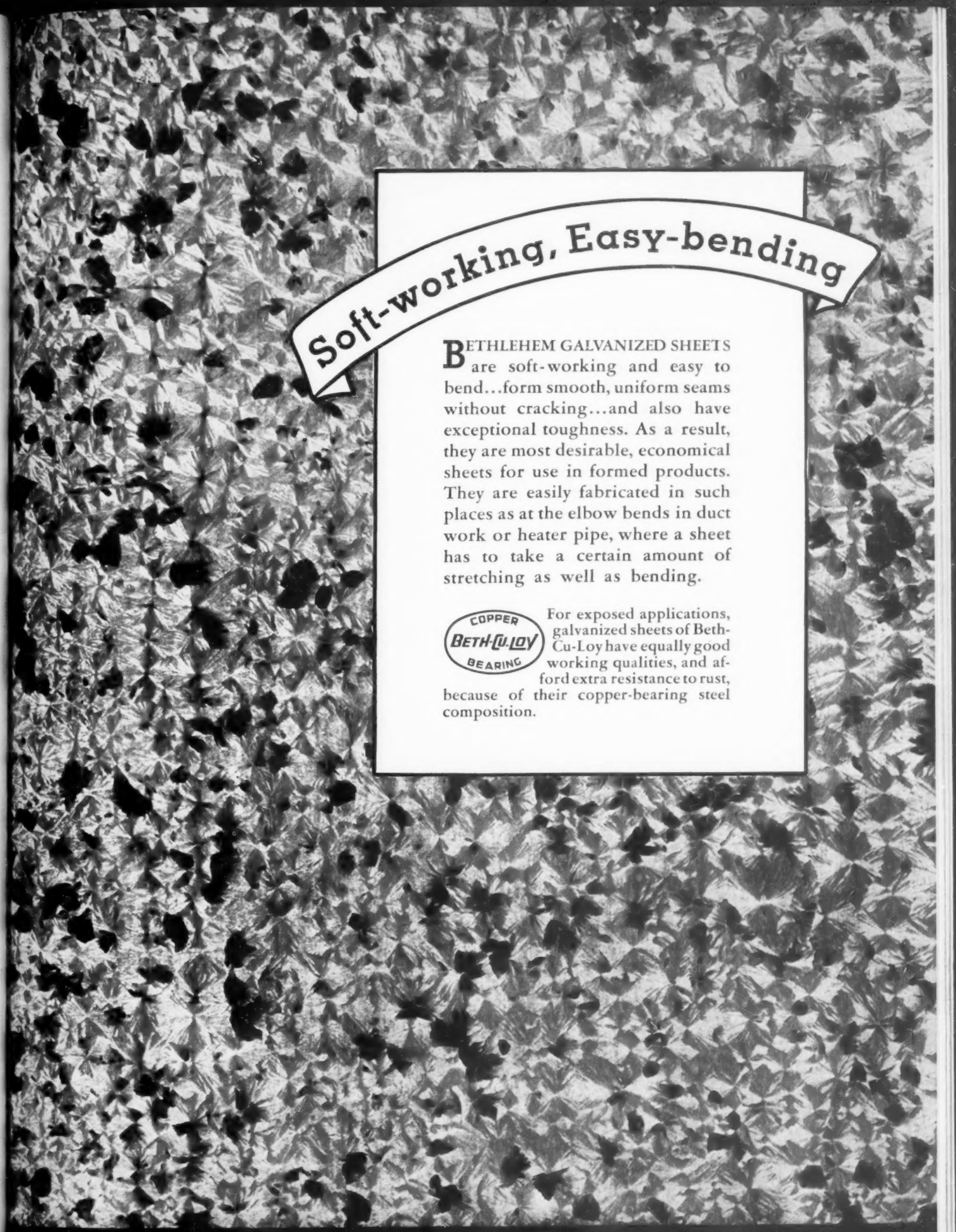
In discussing concrete pickling tubs Mr. Westphal stated that if the pickling bath exceeded 5 per cent acidity, the solution cleaned out the cement and silica mixture and this fell to the bottom of the tub.

John Mordica, superintendent rod and wire department, Bethlehem Steel Co., Sparrows Point, Md., described the construction of brick tubs built in his plant. The pots installed in a straight line are laid up with pure sulphur and never have been pointed up since they were installed four years ago. The speaker mentioned that if he were to build tubs today, vitrified brick would be used both for the shell and tub proper. Should acid work its way through the joints of the tub, he explained, it merely would involve tearing out a portion of the brick and repairing the break. He cautioned that close supervision was necessary in laying up tanks with pure sulphur.

Exchange Views on Acidity

Kenneth B. Lewis, consulting wire mill engineer, Worcester, Mass., advocated the syphon or pump as the best means for draining pickling tanks. He raised the question as to whether there is not a trend today toward higher acidity coupled with a lower temperature of bath in pickling practice. A member stated that practice at his plant was to operate with 10 per cent acidity and at a temperature ranging from 150 to 155 degrees Fahr. The time cycle, he pointed out, is adjusted by temperature control. In the case of low-carbon stock, he stated, the best practice is to increase the temperature as the acidity decreases and he stressed the fact that a superior finish always is obtained by this arrangement.

In speaking on the practice of adding acid to the vats and dumping the spent pickling solution, Mr. Mordica mentioned that solutions were changed at his plant after 600 to 700 tons of coils had been cleaned. Effective practice, he stated, is to start with a solution having an acidity ranging from 7 to 8 per cent, run it down to 4½ to 5 per cent and then add sufficient acid to bring it up to the required strength. This procedure is repeated many times until it is time to dump the spent liquor. Kenneth Lewis considered three to four acid additions good practice. One member advocated dumping pickling tanks when the acidity reached 5 per cent, stressing the fact that the cycle of cleaning is more effective when this practice is followed than when the acidity is al-


Soft-working, Easy-bending
BETHLEHEM GALVANIZED SHEETS are soft-working and easy to bend...form smooth, uniform seams without cracking...and also have exceptional toughness. As a result, they are most desirable, economical sheets for use in formed products. They are easily fabricated in such places as at the elbow bends in duct work or heater pipe, where a sheet has to take a certain amount of stretching as well as bending.
COPPER
BETH-CU-LOY
BEARING
For exposed applications, galvanized sheets of Beth-Cu-Loy have equally good working qualities, and afford extra resistance to rust, because of their copper-bearing steel composition.
BETHLEHEM STEEL
BETHLEHEM STEEL COMPANY
GENERAL OFFICES: BETHLEHEM, PA.

lowed to fall to as low as 2 per cent.

In discussing "Modern Acid Handling Methods Lower Pickling Costs," J. R. Hoover, assistant manager, chemical sales division, B. F. Goodrich Co., Akron, O., presented some of the improvements in equipment and methods employed for pickling steels. The speaker described the method of building rubber lined steel tanks which at present serve as pickling units for a modern broad strip mill. Following the presentation of this paper, discussion brought out the fact that large brick-rubber-steel installations are not much higher in cost of construction than cement or brick pickling tanks but in small installations the cost is considerably higher. While only one course of brick is employed on some rubber lined installations, two courses are desirable on the larger units, the speaker stated. A sufficient head and volume of water is necessary, he warned, in the effective operation of a water syphon in order to maintain the desired pressure when the valve is opened wide.

In the afternoon session a paper on "Hard and Soft Copper Wire" was delivered by R. A. Schatzel, superintendent, General Research Laboratories, Chicago, and "Notes on the Use of Back Pull in Wire Drawing," by P. M. Mueller, engineer, Revere Copper & Brass, Inc., New York.

Sees Economic Advantages in Blast Furnace Air Beneficiation

INCREASING blast furnace production without increasing air blast volume was outlined in a paper by Theodore Nagel, vice president and chief engineer, Carburetted Gas Inc., New York, presented before the Tuesday morning session of the Iron and Steel division, American Institute of Mining and Metallurgical Engineers. In Mr. Nagel's absence, his paper was read by Ralph H. Sweetser, consultant on blast furnace practice, New York.

Beneficiation is accomplished by decreasing the nitrogen content of the blast, concentrating a part of the air blast through liquefying it and distilling off its nitrogen. Heretofore the use of oxygen has been considered too expensive. Low-cost plants producing large quantities of metallurgical oxygen are now available, according to Mr. Nagel, cost being estimated at $3.50 per ton of 95 per cent pure gas, based on a power cost of 0.5-cent per kilowatt hour.

Mr. Nagel attempted to show that the hearth temperature produced with hot blast at 1250 degrees Fahr. can be produced with atmospheric temperature beneficiated airblast (eliminating the need for hot-blast stoves) and that the latter can produce the same weight of CO in the bosh with the same weight of coke per ton pig iron as used in the case with hot blast. Analysis of furnace burdens, furnace products and heat balances with atmospheric temperature blast and hot blast were presented to substantiate the author's claims.

Economies claimed to result from the use of beneficiated air blast at 60 degrees Fahr. include more active reduction with richer bosh gas increasing furnace production; instantaneous at-will furnace operation control; elimination of sluggish furnace caused by high-moisture blast; credit to pig iron cost the cost of hot stoves operation; cooler top gas; etc. Mr. Nagel concluded by stating that the 180,000,000 tons of inert nitrogen passing through the blast furnace system for an annual production of 40,000,000 tons of pig iron can be reduced to 80,000,000 tons of nitrogen through air blast beneficiation.

Reports of later technical sessions of the conventions of the societies participating in the National Metal congress will be presented in subsequent issues of STEEL.

THE EDITORS

A. J. Boynton, vice president, H. A. Brassert & Co., Chicago, questioned the practicability of air blast beneficiation, and declared that an extensive study of costs and results would be necessary to determine the economic feasibility of the plan.

Prof. G. B. Waterhouse, Massachusetts Institute of Technology, Cambridge, Mass., noted a number of errors in Mr. Nagle's calculations, pointing out, for instance, that a quick check disclosed a 36 per cent error in the heat balance.

T. L. Joseph, bureau of mines, Minneapolis, commented upon the paper and stated that nitrogen in the blast furnace acts as a gas diluent and does not affect the rate of reduction, the latter being determined by the ratio of CO to CO_2. He suggested that the best field for application of air-blast beneficiation would be in the production of ferro-alloys. Considerable doubt was expressed by others at the meeting as to the possibility of obtaining metallurgical oxygen for as low as $3.50 per ton.

The past five years have witnessed a marked improvement in Southern furnace practice, according to Francis H. Crockard, metallurgist, Republic Steel Corp., Birmingham, Ala. He pointed out that this has been brought about by improved raw materials, modern furnace design and careful attention to the handling of the iron after it leaves the furnace.

Coke ash has been reduced, resulting in lower cost of operation, closer silicon control and improved porosity. Pulverization of coal has yielded better coke structure. Sizing of both coke and ore has resulted in better operation and a higher quality product.

A study of furnace lines shows a definite trend toward wider stock lines, resulting in great reduction of flue dust loss. Other improvements have been introduced in furnace construction, including a practically permanent bosh. Better practice has resulted in reduction of coke consumption from 3000 to 2200 pounds per ton of iron in spite of burdens containing only 35 per cent iron and yielding over 2000 pounds of slag per ton of iron.

Beneficiation of Michigan iron ore formations was outlined in a discussion by Frank J. Tolonen, Michigan College of Mining and Technology, Houghton, Mich. He reviewed the various iron formations of Michigan and the necessary steps in beneficiating the lower grades. Methods for eliminating sulphur minerals, and silicon were described. Gravity concentration methods are used to eliminate silica and efficiency of this process has been increased materially by substituting a suspension of ore fines for water as the separating medium.

The quarrying and preparation of blast furnace flux stone meeting certain specifications, especially as to size, cleanliness and regularity, as carried on by the Marble Cliff Quarries Co., Columbus, O., were detailed by Paul C. Hodges, vice president of the company. Drilling and blasting, crushing and screening and calcining were described. Two plants of the company have a capacity of about 5000 tons each per 10-hour day. One handles ballast stone; the other flux stone.

Several blast furnace superintendents attending the meeting spoke briefly of their experience with flux stone, as well as current practice. They included R. M. Lewis, Youngstown Sheet & Tube Co., Indiana Harbor, Ind.; H. W. Johnson, Inland Steel Co., Chicago; R. A. Field, Jones & Laughlin Steel Corp.; and W. E. Brewster, Wisconsin Steel Co.

The WISE CHOICE!

• • • *in the specification of Pipe*

What kind of service will it give when installed and how long will it last, are the two main points the wise buyer considers in his choice of pipe. To give the ultimate in performance, pipe must be clean and smooth, inside and outside; that is, it must be free from mill-scale. Such scale causes corrosion and contributes to deterioration in the pipe line. NATIONAL Scale Free Pipe, therefore, is a wise choice. It is made by a special Scale Free Process, applied to butt-weld sizes ½ to 3-inch. Here are the outstanding advantages of this clean, smooth pipe—

Minimized corrosion—particularly pitting—Clean, smooth surfaces, inside and outside—Full delivery capacity—less friction loss—No damage to valve seats; no clogging of small orifices—Greater strength at the weld.

When you order standard pipe for any purpose, be sure to specify NATIONAL Scale Free and secure the maximum in performance and economy. Large use by discriminating buyers, continued through many years, has made it—*America's Standard Wrought Pipe.*

CHROMATE TREATMENT—*All National Galvanized Pipe is given a special chromate treatment to resist discoloration and the formation of white rust. This patented process preserves that smooth, glistening surface or metallic lustre which is characteristic of good galvanizing.*

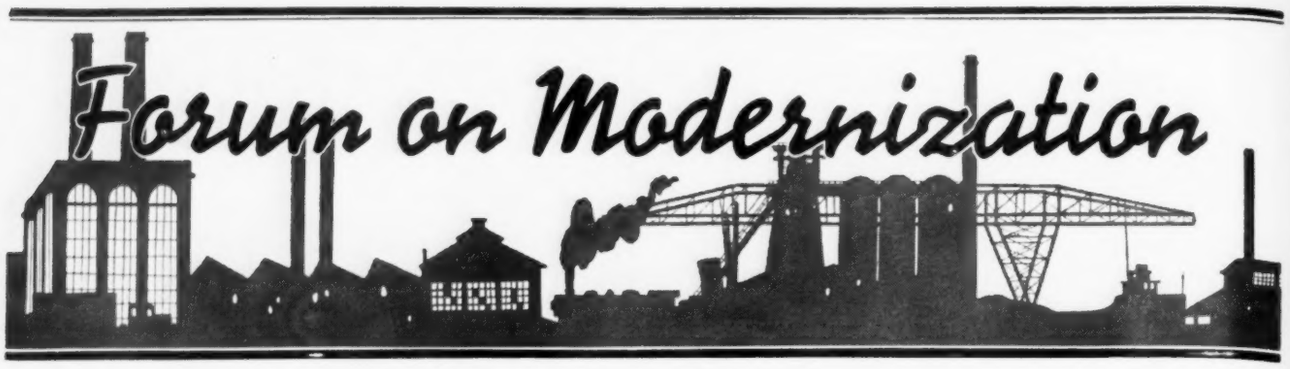
NATIONAL TUBE COMPANY · Pittsburgh, Pa.

Pacific Coast Distributors—COLUMBIA STEEL CO., San Francisco, Calif.

Export Distributors—UNITED STATES STEEL PRODUCTS CO., New York, N. Y.

United States Steel Corporation Subsidiary

NATIONAL SCALE FREE PIPE SPELLERIZED



History Proves Time To Rehabilitate Equipment Is During Depression

BY M. I. ARMS
President, Aetna-Standard Engineering Co.
Youngstown, O.

TO BUY or Not to Buy" — a serious question confronting many steel mill executives today. Perhaps the best way to approach the proper solution of that problem is to look at the record and to supplement our own knowledge with the experience of those who have lived before. Down through the ages experience has been the best, and in fact, the only teacher. Without it there would have been no progress and no achievement in the world.

Carnegie Bought in Bad Times

History tells us that Andrew Carnegie increased the profits of his company substantially by carrying out programs of modernization in his plants during periods of business depression. On such occasions he replaced obsolete and worn out mills and machinery with equipment of the latest design in order to increase tonnage and to reduce the cost of production. Even though the volume of business may not have been sufficient to operate those new units at a profit at the time of installation, still his judgment was wise because the enormous savings made by purchasing equipment at depression prices more than offset any losses due to temporarily low operations. Accordingly, after business had returned his plants were well equipped to produce at the lowest possible cost, and, if he had desired, he could have undersold all competition.

Any close observer of recent business procedure would find that, as a general rule, the steel companies during the last 25 years or more have adopted an opposite policy and have waited until good times had returned and the road ahead looked clear before modernizing plant and equipment. It is, of course, true that great courage is required to spend large sums of money for capital goods when earnings are small and the future seems dark, but experience has proved that the man who makes the greatest profits usually is the one who dares to go ahead while others remain inactive

Politics Always with Us

The largest single obstacle standing in the way of the immediate execution of many rehabilitation programs seems to be a fear of the political situation. No man can foresee what the administration at Washington is going to do regarding many vitally important and far-reaching matters, but to a greater or less degree we always seem to have this uncertainty with us, and, regardless of our worries and fears, somehow things usually manage to turn out all right in the end.

The statement to the effect that it is a mistake "to sell the United States short" is just as true today as the day it was uttered many years ago. The general trend of business in this country has been upward, and even though there have been frequent periods of severe recession, still the record is sufficient proof of the fact that each succeeding peak on the business chart has reached a greater height than the one before it. What the years ahead will bring is, of course, uncertain, but inasmuch as important decisions must be made upon an interpretation of the future, is it not safe to base our calculations upon an accurate record of previous years?

Without an intelligent analysis of the past it is impossible to comprehend the tremendous progress made in the steel industry since the turn of the century. Statistics are available showing an unbelievable increase in steel tonnages, but to the average man events reaching back 30 or 40 years are vague and uninteresting.

Expansion Trend in Steel

A personal reference here, to illustrate a point, may be interesting. The writer's own father, Warner Arms, devoted most of his life to the iron and steel business. For many years he was president of the old Falcon Iron & Nail Co., and later, the Falcon Sheet & Tin Plate Co. at Niles, O. During the formation of the "trusts," in 1898, that company was sold to the American Tin Plate Co., and father entered the employ of the latter company as vice president in charge of operations. After several years, this company was combined with other "trusts" to form the United States Steel Corp.

About 1902, father retired from active business and after a year of leisure, time having grown heavy, he returned to his old home in Youngstown, O., and looked for something to do. Two positions were offered to him—one was the presidency of a rubber manufacturing company, and the other was the presidency of the Youngstown Sheet & Tube Co. I well remember the day when he told me about his decision and his reasons for it. He said, "I have decided to go with the rubber company because the rubber business is in its infancy and it offers the unequaled opportunities of a new industry, while the steel business has expanded so rapidly in the last decade or two that I cannot see how it can continue to grow at the same rate as in the past."

At that time the productive capacity of the steel industry was greatly in excess of normal demand, and it was impossible to see how consumer requirements could catch up with it. However, in 1935, viewing the past in retrospect, we find that the rate

of increase in the steel business was greatly in excess of the fondest hopes of those early days. Consequently, anyone disagreeing with the present prediction that the steel business will continue to expand as it has done in the past, may be just as wrong about the future as my father was 32 years ago.

At the present time almost every steel company, whether large or small, has definite plans for extensive modernization of mills and equipment, the intention being to place these plans into execution as soon as business and political conditions, the security market and net earnings become more favorable. In the last analysis, the chief reason behind any modernization program is to secure additional profits by the lowering of production costs and the speeding up of output. The above plans are now in the blueprint stage, but as long as they remain in that form many real opportunities for additional profits will be lost.

It may be argued thus, "We would like to proceed with our plans at this time and would do so if it were not for the fact that large improvement programs cost a great deal of money, and we do not have a surplus of cash available for investment in capital goods. Furthermore, the security market does not lend itself advantageously to the selling of new issues of stocks and bonds so that new financing for such purposes is a difficult, if not impossible, problem for us." In answer to such an argument, however, it is pointed out that the lack of funds for capital goods may be overcome by the use of a recently developed scheme to finance the purchase of rolling mills and other steel plant equipment without resorting to permanent financing. This plan, while new, has been tried and proved sound, and it is worthy of serious consideration by the steel industry.

In regard to the existing cost of new machinery, it is, of course, impossible to buy now at prices as low as those available three years ago, but today's prices when viewed from several years hence may seem like real bargains to us. This is one source of profit which should not be overlooked.

Now, the desire to allow the clouds on the business horizon to clear away before taking any important step seems to be fairly general, but inasmuch as the steel industry is gradually emerging from the shadow of the depression and will soon be basking in the sunshine of prosperity, any policy of delay may prove to be a matter of sincere regret before many months have gone by.

At any rate, we are certain of these encouraging facts—general conditions are decidedly better than at any time since 1929, Congress has adjourned, demand in all lines of work is increasing, industrial profits are rising, and the entire business atmosphere has taken on a new tinge of optimism. The current flow of orders to the steel mills and the prospects for increasingly greater tonnages in the near future are sufficient justification for the immediate purchase of machinery of the latest type and efficiency.

The conclusion, therefore, that now is the right time to buy is based upon experience borrowed from the past and coupled with a knowledge of present economic conditions. Consequently, any man who has courage, the wisdom and the forsight to proceed with a program of modernization at this time is bound to reap rich rewards, just as Andrew Carnegie did many years ago.

Replacement Program Essential To Meet Production Demands

BY J. E. ANDRESS
President, Barnes Drill Co., Rockford, Ill.

IN THE race for winning new consumer markets, manufacturers are constantly achieving new goals in the comfort, convenience and trouble-free performance of their products, as exemplified by the automobile, radio, all types of household appliances, air conditioned homes and transportation equipment and a wide range of other consumer goods. Refinement of these devices has imposed a demand on production equipment for greater accuracy, closer tolerances and a more perfect assembly.

The shop which does not keep its equipment up-to-the minute in performance cannot attain or maintain required accuracies in finished products, nor can such a shop survive long in modern highly competitive conditions.

Machine tools at one time were used purely for removal of metal, or, in other words, for roughing cuts; finishing and fitting was done largely by hand methods. But through the years the burden of accuracy and quality of finish has come to be thrown upon the machine tool, the result being the development of many new and highly specialized machines to make possible the increased accuracy and uniformity of size and quality of product, and at the same time to make possible greatly increased productivity with accompanying reductions in the cost per piece.

In the drilling machine field, there have been many new developments in machines for boring, drilling, reaming, facing and tapping. Cone driven drills have long since had their day, and with the coming of high-speed twist drills and other modern tools came the all-geared drilling machine produced as early as 1907. Today, practically all drilling machines are of the geared type, providing increased power, speed, productive capacity and accuracy.

Six Reasons for Replacement

Similarly, in regard to honing machines, the introduction of the hydraulically reciprocated multiple-cylinder honer saved considerable labor over internal grinding methods and also provided increased accuracy from the standpoint of roundness and straightness of bore. Today, honing is universal practice for automobile cylinder finishing. With modern honing machines it is possible to finish within 0.0001 to 0.0003-inch in many classes of small bores on a production basis.

Citing briefly a number of reasons for a replacement policy in capital goods, the following are the principal ones that come to mind:

1. Depreciation and obsolescence are continuous and must be met by replacement.

2. For production work it is always profitable to replace machines 10 years old and often machines five years old, if and when there are better units built.

3. Money invested in 1935 designs of machine tools has more earning power than when invested in securities.

4. A shop with up-to-date equipment will attract and hold the best workmen.

5. Installation of new equipment usually permits minimized plant floor space as well as increased production and superior quality of product.

6. With advancing processes and production methods, old machine tools become inefficient and expensive to operate.

To meet competition, maintain profits, and to attain increased volume of output with required high degree of precision, a real replacement program, for these and other reasons, becomes imperative.

WEIRTON

Producer of

WEIRITE QUALITY

Tin Plate — Special Coated Manufacturing Ternes and Black Plate

Unexcelled in Method of Manufacture and Uses

Uniform for Gauge and Drawing Qualities

PRODUCTS Include

Pig Iron
Open Hearth Steel
Billets—Slabs—Sheet Bars—Skelp
Structurals
Angles—Beams and Channels
Round—Square and Flat Bars
Rails—Steel Plates—Tie Plates
Track Spikes—Splice Bars
Reinforcing Bars
Coke Tin Plate
Kanners Special Cokes
Best Cokes—Charcoals
Lacquered & Coated Tin Plate
Tin Mill Black Plate (All Finishes)
Lacquered & Coated Black Plate
Copper Bearing Terne Plate
Sheets
Galvanized—Black and Blue Annealed
Corrugated Sheets—V-Crimp Sheets
Roll Roofing—Plain Brick Siding
Long Terne Sheets
(Common and Special Finish)
Strip Steel & High Finish Sheets
Single Pickled—Full Finish & Auto Body Sheets
Fender Stock
(Many gauges and grades up to seventy-five inches in width now available)
Hot and Cold Rolled Strip Steel
Coke—Tar—Benzol—Toluol—Ammonium Sulphate

Every process of manufacture from mining of iron ore to finished marketable product is under complete ownership control assuring Weirton customers at all times with quality preeminently suitable for their requirements.

WEIRTON STEEL CO.

Division of National Steel Corporation

WEIRTON W. VA.

SALES OFFICES IN ALL PRINCIPAL CITIES

Steel Mill Engineers Discuss Open-Hearth Insulation, Rolling Control, Lubrication

OPEN-HEARTH insulation involves more than the application of insulating material on the furnace. Design and operation are affected; type of fuel, flame and draft control must be co-ordinated with the new characteristics; and the men who operate the furnace must be sold on the value of insulation. These facts were brought out by Gilbert Soler, manager of research, Timken Steel & Tube Co., Canton, O. at the combustion engineering division of the Association of Iron and Steel Electrical Engineers, which held its 31st convention at the William Penn hotel, Pittsburgh, Sept. 24 to 26. A resume of papers presented at the meeting during the first two days was presented in last week's issue of STEEL.

Fuel savings directly due to insulation may amount to 15 per cent, Mr. Soler stated. A saving of as much as 4 per cent may be made in the furnace time through faster melting and less chilling between tapping and charging. In some cases, he emphasized, the scrap iron content of a charge may be increased when the furnace is insulated. The speaker warned that insulating material must be selected and applied according to the properties of the material and the conditions under which it will be used. For use in regenerators, flues and fantail arches he recommended brick for new construction and plastic or granular material for application to existing furnaces. The material selected should withstand temperatures up to 1500 degrees Fahr. In the case of slag pockets, uptakes and downtakes, a temperature of 2000 degrees Fahr. must be withstood.

Factors that Govern

Low heat conductivity may be sacrificed in favor of refractoriness in some cases where insulation is applied above floor level, and the thickness multiplied according to temperatures and operating conditions, Mr. Soler also stated. Roof insulation requires from 2½ to 3 inches of material and in some cases it has been found economical to elevate the furnace roof in order to take advantage of the economies to be derived from insulation. As to advantages of insulation, Mr. Soler pointed out that furnaces with insulated backwalls show cleaner banks, work more evenly, and tap cleaner than uninsulated units, refractory life being about the same.

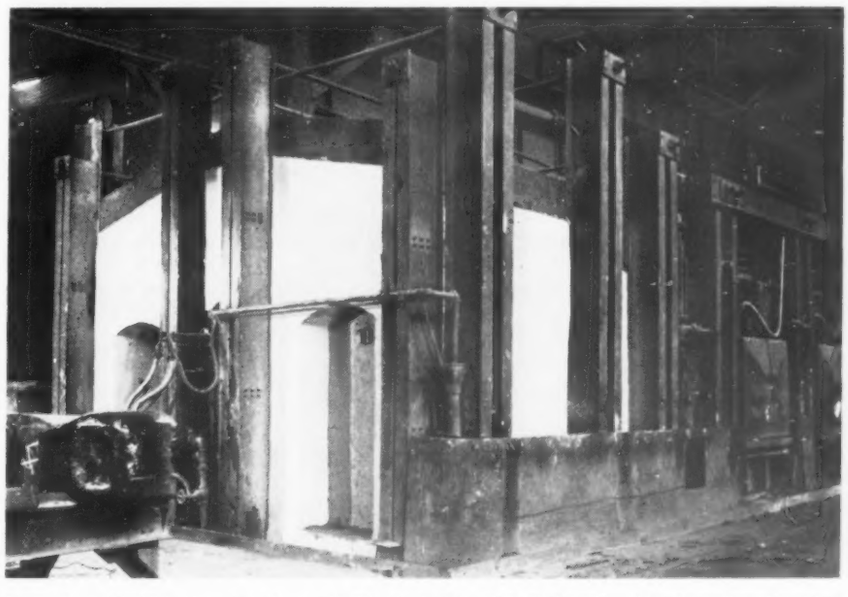
Next year's annual meeting of the Association of Iron and Steel Electrical Engineers will be held in Detroit.

Every furnace project should be considered individually, the speaker pointed out. The specific conditions involved should be studied and special treatment made accordingly. He was of the opinion that new furnaces may be insulated fully at the start, or old furnaces insulated step by step to overcome specific conditions. No single material as yet developed, he declared, will meet all the conditions, so that the problem of open-hearth insulation offers an interesting field for development, with substantial economies to the plant which solves its individual problems in the most economic manner, balancing all factors involved and using the right kind of insulation in the correct manner and amount.

The design, construction and operation of the venturi open-hearth port and the results accomplished therewith in comparison with the orthodox ports previously used and with the damper controlled ports which were conceived and to a considerable extent developed at approximately the same time the venturi port was being put into successful use, were discussed by Mr. G. L. Danforth, Jr., president, Open-Hearth Combustion Co., Chicago.

He pointed out that the venturi port, when designed for natural gas, provides a smaller throat for introducing the air and gas, and a wider downtake for exhausting the waste gases than were permissible in the previous construction for such fuel. Inasmuch as the development and direction of the natural gas flame are dependent on a high velocity flow of air, the speaker explained that the smaller throat is of material assistance in this respect, and the larger downtake not only assists in making the smaller port permissible, but also reduces the velocity of the outgoing gases at this point and minimizes the damage to the adjacent end wall.

A large number of open-hearth furnaces now are equipped with the venturi port, with a notable increase in



Open hearth furnace at plant of Timken Steel & Tube Co., Canton, O., showing insulation above ground

production and decrease in the expense for labor, fuel and furnace maintenance. Mr. Danforth asserted that even with a cheaper grade of materials in the furnace charge, the furnace construction affording the best combustion control will produce a better quality of steel.

J. P. Walters, open-hearth superintendent, as co-author with Dr. E. G. Hill, director of research, Lukens Steel Co., Coatesville, Pa. in speaking on "The Pouring of Molten Steel" cited the fact that the general trend of the yield from steel ingots has been downward, according to statistics. He attributed this to the more stringent specifications and more critical inspection of finished steel. As the yield is the percentage of the original ingot weight found in the form of finished steel, the speaker pointed out, it is obvious that steelmakers are making every effort to product ingots which will increase the yield.

Modern Furnace Practice

To handle the large mass of metal tapped from modern furnaces, the oval ladle has been adopted. Stopper rod assembly has been standardized in plants in order to eliminate the personal factor. Harder burned nozzles are used. In both top and bottom pouring practices much effort and ingenuity has been spent in preventing splash. The rate of rise of metal in molds is controlled by basket pouring, the use of double nozzles, varying nozzle size to suit the mold and regulating the number of molds per bottom plate. The speaker mentioned the importance of mold design and the many advantages for the use of copper stools, and better ingot surfaces. Prolonged mold life are being obtained by the use of mold washes such as tar, graphite, talc, asphalt lacquer, carbon black, lime and aluminum paint.

The foregoing, as mentioned by the speaker, are some of the weapons which the production man is using in his fight to produce ingots which will roll into steel free from scabs, snakes, pits, slivers, laminations, and blisters. As these decrease, the speaker concluded, his yield increases and conversely the pressure from above goes down.

In discussing "Roof Temperature Control of Open-Hearth Furnaces," M. J. Bradley, engineer, Leeds & Northrup Co., Philadelphia, pointed out that temperature if measured on the outside of the roof or between the roof brick and insulation gives little information of actual temperatures of the inside surface of the brick. The heat penetration or soaking temperature, the speaker mentioned, is the most important when considering roof control. Results have demonstrated, he stated, that the soaking temperature measured in the brick approximately 1 inch of the inside surface is adaptable to roof temperature control.

On insulated furnaces, the first helper has a tendency to play safe and so operates the furnace at a lower temperature in order to protect the roof. Protection afforded by roof temperature control, the speaker said, enables him to run the furnace close to the maximum safe temperature continuously, which results in a shortening in the time of heats and an increase in production per hour. Mr. Bradley pointed out that in some cases this improvement has resulted in an increase around 12 per cent in production per hour and an increase of around 15 per cent in the length of roof life over previous campaigns.

T. B. Bechtel, engineer, Electric Furnace Co., Salem, O., in speaking on "Applications of Controlled Atmosphere to Heating of Steel" mentioned that there has been developed a mixed gas controlled atmosphere which covers the requirements of the fields of bright annealing, scale free hardening, continuous brazing and other correlated processes in a much broader sense than previously was available. He emphasized that the economic use for controlled atmosphere will be found to lie largely in the fabricating and finishing fields: more particularly on cold finished parts but also with some important applications to hot worked products. The speaker described the bright annealing of cold rolled strip, both in batch and continuous furnace equipment with the use of controlled atmosphere.

Single Anneal Is Used

By careful control of rolling and other steps in the process of manufacture, some metallurgists are able to produce deep drawing sheets of fine grain structure, by a single anneal, having properties equal to normalized sheets, stated A. N. Otis, industrial engineering department, General Electric Co., Schenectady, N. Y. Mr. Otis in speaking on "Bright Annealing of Sheets and Strip in Electric Furnaces" mentioned that others preferred to normalize, as giving better assurance of grain refinement, and furthermore, he questioned whether a single high temperature normalize or a single low temperature anneal will give the required properties, or whether a normalize and anneal is desirable.

The continuous method of heat treatment is attractive, he pointed out, because of the short time in process but the bright surface must be maintained, he cautioned, in order to avoid pickling, and the surface must not be marred by the handling equipment. The speaker was of the opinion that these operations can be performed satisfactorily but he questioned whether good physical properties can be secured consistently by this particular method. He presented the results of a series of tests which was conducted in an attempt to determine the properties that might be expected.

Three types of furnaces most commonly used in the steel industry for heat treating namely the roller-bottom, the walking-beam and the chain furnaces were described by W. E. Blythe, district manager, Driver-Harris Co., Detroit. His paper contrasted briefly the three types but dealt largely with the development of dry or alloy shafts for roller-bottom furnaces over the past decade and through the introduction of the inside bearing shaft some four years ago.

At the opening session of mechanical and lubrication engineering divisions, Thursday, which was held simultaneously with those of the combustion engineering division, H. M. Richardson, application engineer, plastics department, General Electric Co., Lynn, Mass., explained the outcome of surface tests which he conducted on the composition bearings for roll necks and other purposes. He mentioned that if the temperature of the cooling water is high the life of the bearing will be shortened, inasmuch as high friction causes a breakdown of the bearing material.

Lubrication of Bearings

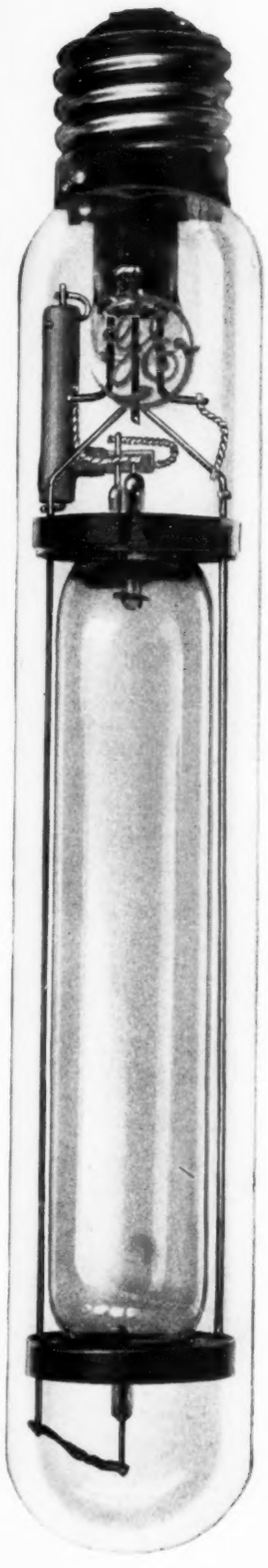
Where the water temperature does not exceed 43 degrees Cent. and where plenty of water is used on the bearing while in service, no difficulty in the operation of these bearings should be encountered, the speaker stated. He mentioned that a small amount of grease tends to stabilize the co-efficient of friction. He also recommended swabbing roll necks with grease when the mill is first set up.

Emulsion of mineral oil is more stable at low speeds, Mr. Richardson explained; it has an advantage over ordinary water. He mentioned, however, the best application of this type of oil is on cold mills where it is recirculated.

The amount of water required for cooling composition bearings depends on the amount of heat, the duty cycle, the amount of heat transmitted to the roll necks and the effectiveness of the water to carry away heat. The speaker mentioned that scouring frequently occurs on alloy steel rolls and is caused by the surface of the bearing becoming charged with abrasive material. As a remedy for this condition, the speaker recommended good steel guards for keeping the abrasive material out of the water supply.

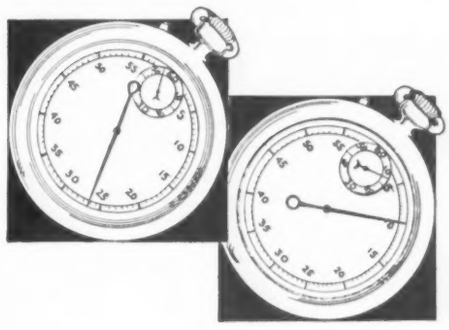
One of the most important advantages of composition bearings in 4-high mills cited by K. T. MacGill, manager, Glyco-Rytrex division, Joseph T. Ryerson & Son Inc., Chicago, is that the diameter of the roll neck can be increased 25 per

(*Please turn to Page* 61)



Quicker
VISUAL RESPONSE

saves time and promotes safety



Details unseen under other types of commercial lighting are clearly *and quickly* visible under the new General Electric High-Intensity Mercury Vapor Lamp. Long hours of work under this light produce no eye-strain. Excessive contrasts between light and shadow are eliminated. What few shadows there are, are luminous.

Greater lighting efficiency—more lumens per watt—is one of the inherent qualities of the G. E. High-Intensity Mercury Vapor Lamp. In fact, the lamp costs less to operate than ordinary light on the basis of light emitted per watt of power.

Full details are contained in a sixteen-page booklet which can be secured by writing the General Electric Vapor Lamp Company, 885 Adams Street, Hoboken, New Jersey.

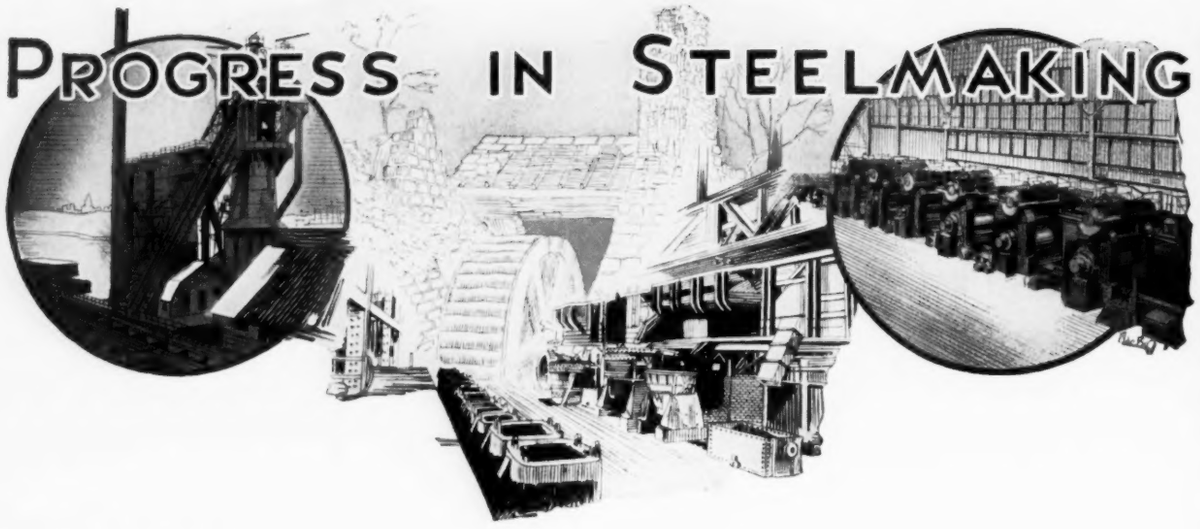
GENERAL ELECTRIC VAPOR LAMP COMPANY

Order your auxiliary devices which were designed especially for this lamp from the General Electric Vapor Lamp Company.

HIGH INTENSITY
Mercury Vapor Lamp

657 Copr. 1934, General Electric Vapor Lamp Co.

PROGRESS IN STEELMAKING



Coating Offers Protection

Improved protection for steel structural members exposed to corrosive gases and liquids is claimed for a new coating which is composed of bituminous compounds and a granular mineral aggregate. The coating is applied pneumatically with equipment similar to a cement gun to a thickness of about 1/16-inch in two or more coatings. The first application serves as a penetrative, adhesive and elastic covering; subsequent coats serve to provide resistance to mechanical injury. The compound is advocated as a protection for structurals subjected to extreme smoke exposures, bridges, smoke stacks, standpipes, gasometers, etc.

• • •

Simplifies Wheel Changing

Driving overhead traveling cranes by only two wheels has been found satisfactory in many departments of a Pittsburgh steel plant. For example, a 275-ton crane for handling rolls, built with a double bridge drive with eight of 16 wheels serving as drivers, was altered by removing the idler pinions and driving with the four outside wheels of the four exterior trucks. Not only is operation highly satisfactory but the arrangement simplifies the installation of new driving wheels at any future time.

• • •

Affects Rolling Quality

Based on a study of over 150 high-sulphur bessemer blows made in the Pittsburgh district, the lower the residual sulphur the more satisfactory the rolling quality of the steel. High residual sulphur may affect adversely the machinability of the steel, in the opinion of a metallurgist. Holding the sulphur in bessemer iron between 0.030 to 0.040 per cent is considered good practice by many bessemer operators.

• • •

Reduces Power Consumption

Approximately 103,600 net tons of plates have been rolled on a 90-inch 3-high plate mill in the South equipped with composition bearings. Metallic bearings averaged about 10,000 tons. End thrust has been eliminated and power consumption reduced more than one-third. On the tonnage rolled the wear of the nonmetallic bearings has amounted to 7/16-inch.

• • •

Protects Polished Surface

Polished steel coated with a recently developed slushing oil can be left standing indefinitely in all sorts of weather without fear of deterioration. The compound also is suitable for coating machinery and other metal parts to prevent rust while in transit or storage. The oil is heavy in consistency, of greenish color and leaves an amber film when applied to metal.

Four Money-Saving Ideas

Resharpening worn files at a plant in the Pittsburgh district yields from four to five times as much service as can be obtained from new files. Steam at 90 pounds per square inch pressure is used to blow fine silica sand against the back of the file teeth. The files then are dipped in a solution consisting of two parts kerosene and one part of machine oil, and wrapped in paper. When used files no longer can be sharpened by this means they are recut by an outside concern at a cost of 2 cents each, which affords a saving of 33 cents compared with the cost of a new file. Longer service is obtained from new files by subjecting them to the previously mentioned sharpening process upon delivery.

• • •

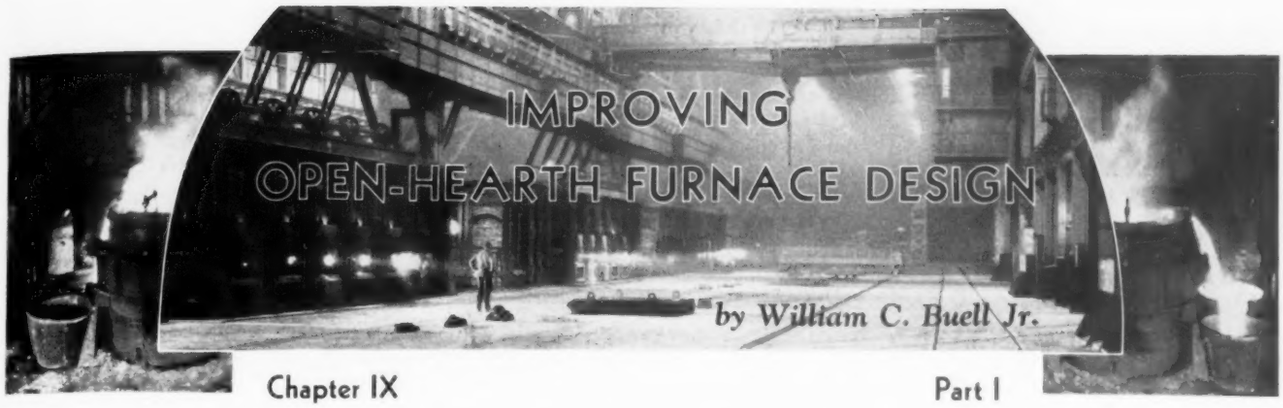
Pipes in floors and walls may be located without digging up unnecessary parts of the flooring by connecting the electrodes from a welding set to the ends of the pipes and using an ordinary compass. Deviation of ½-inch or less from the direct line of the piping will be detected by the compass needle even though the piping may be buried 1 foot or more below the surface.

• • •

Wire rope, which operates under ground or in water, can be preserved by saturating it with mineral or vegetable tar to which fresh slaked lime has been added in the proportion of 1 bushel of lime to 1 barrel of tar. The lime serves to neutralize the acid.

• • •

Baffle plates in spray booths may be kept clean by spraying the interior of the compartment before using with a liquid soap. The latter may dry but will not harden. By this arrangement a membrane of soap will exist between the metal wall of the booth and the deposited paint. The spent paint and soap can be removed easily with a wooden scraper. Tests of spray painting show that fully 90 per cent of the waste spray is caught by the baffles.



IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter IX — Part I

Factors for Calculating Thermal Effects in Regenerators

FOR the analytical study or consideration of thermal actions and reactions in regenerators definite information is required as to the entering and leaving temperatures of all fluids passing through each regenerator, the quantity of heat contained in the several fluids when entering and leaving each regenerator, the exposed surface area of the checkerwork and the containing structure which will act as heat exchange media, and the velocity of the several fluids during their passage through each regenerator.

ITEM 1. All fluid temperatures are subject to considerable variation from differences of practice and operation, to wide fluctuations within comparatively short time intervals from reversal action. In any general discussion, it, therefore, is necessary to develop mean temperatures that are representative of average conditions.

Data Are Unsuitable

A source of information as to temperature conditions should be the heat balances of the furnace and process but for various reasons those published are not particularly suitable for this purpose. During the past 25 years four heat balances of open-hearth furnaces have been published in the English language and some additional in French and German. The French and German practices are so different from the American that little comparative data of value can be gleaned from them.

From the writings in English* the author has abstracted data that are pertinent to the subject of temperature and has listed them appropriately for comparison in Table CXXIX. Results from the Whigham paper are tabulated in Column A. Although the figures were presented nearly 25 years ago, the results particularly are valuable as they show the distribution of the heat through the furnace system as an average of 469 heats. Unfortunately, the balance is presented in quantitative form and but few of the temperatures of qualitative analysis are given. If this balance is

*Fuel Possibilities in Steelmaking, by William Whighan, Yearbook of A. I. & S. institute, 1913, p. 294.

A Thermal Study of an Open-Hearth Furnace, by W. M. Henry and T. J. McLoughlin, Yearbook A. I. & S. institute, 1931, p. 123.

The Thermal Efficiency and Heat Balance of an Open-Hearth Furnace, by C. L. Kinney Jr. and G. R. McDermott, Yearbook of A. I. & S. institute, 1922, p. 164.

British Siemens Furnace Practice, by F. Clements, Journal I and S. institute 1922, p. 429.

Table CXXIX

Thermal and Other Data as Abstracted from Published Open-Hearth Heat Balances

Heat Balance		A	B	C	D	E
Test made	1	1911	1931	1921	1922	
No. heats included	2	469	1	1	1	
Tons steel tapped	3	53.6	64.4	79.2	59.4	
Percent hot metal	4		none	64.2	50.0	
Time of heat	5	11 hrs.- 55 min.	7 hrs.- 25 min.	10 hrs.- 5 min.	13 hrs.- 45 min.	
Fuel	6	Natural gas	Coke oven gas - oil	producer gas	producer gas	
Btu. / ton ingots	7	5740800	6171000	5830000	5106000	
STEEL TAPPING ANALYSES, PER CENT						
C	8		0.07	0.12	0.06	0.15
Mn	9		0.36	0.20	0.22	....
Si	10		....	0.002	trace	....
P	11		0.01	0.008	0.051	....
S	12		0.028	0.030	0.020	....
Temp. slag, deg. Fahr.	13		2900	3150	3035	3000
Temp. steel, deg. Fahr.	14		2900	3050	2966	2900
TEMPERATURE FLAME, DEGREES FAHR.						
A2 Entering	15		3170		3290	3400/3500
A1 Center	16		2990			
A8 Leaving	17		2890			3000
TEMPERATURE FURNACE GASES, DEGREES FAHR.						
Before reg.	18	1900	2630	2474	A-2840 G-2820	2850
After reg.	19	1030	1644	1283	A-1436 G-1103	P-1350 O-T-1250 other-1200
Before w. h. boiler	20			1260		
Stack	21		1210		1040	
ANALYSES OF FURNACE GASES, PER CENT						
Before Regenerators						
CO_2	22		13.46	14.3	15.2	
O_2	23		2.00	1.7	4.0	0.00
CO	24		....	2.15		0.00
Air + or −	25	+77	+9.9	15.3	+23.0	+0.0
After Regenerator						
CO_2	26		11.96	13.1		
O_2	27		4.10	4.4		
CO	28		....	1.0		
Excess air	29		22.8%	12.0%		+10
At Stack or Boiler						
CO_2	30	5.31	8.40	13.8		
O_2	31	13.05	9.10	5.1		
CO	32					
Excess air	33	155	72.2	31.0		+15
TEMPERATURE OF PRODUCER GAS, DEGREES FAHR.						
Before valve	34			1400	941	
Before reg.	35			1035	1022	P-1250 M-500
After reg.	36				1924	2100
Uptakes A2	37			1780	2230	2250
TEMPERATURE OF AIR						
At valve	38		81	102	91	100
Before reg.	39			625	415	500
After reg.	40		2062		2381	P-1900 other-2000
Uptakes A6	41			2272	2375	P-2050 other-2150
Through valve, per cent	42	+40	−41.8			+0

recalculated to equivalent contemporary practice with a natural gas fuel rate of about 4,800,000 B.t.u. per ton of ingots and showing about 30 per cent excess air at the stack, with a proportionate decrease through the rest of the system, the quantitative values probably will be the best available.

The data of Henry-McLoughlin paper is listed in column B, Table CXXIX. This balance in common with the two following was developed from a single heat and it is extremely doubtful if the results of any single heat are sufficiently authoritative to definitely establish any values. It would appear that the combined average results of 10 or 12 following heats at about the middle of a campaign would give a fair idea of the average performance of a particular furnace that would be of value in improved design. The development of a complete balance over even a single heat is a precise, arduous and costly operation, but one has only to read the discussion accompanying these several papers to observe how bitterly the worth or correctness of the detail is questioned by other technologists.

Considering the extreme number of noncontrollable or nonmeasurable items or variables that have some effect on the results and are ever open to destructive comment or criticism by commentators of equal professional standing with the authors or collaborators, would not worthwhile and usable data be accumulated more rapidly were the inconsequential mass of detail omitted and more attention paid to the few but easily secured data of an accuracy commensurate to the best experimental results? This would develop more heat balances of the individual components and effect a more rapid improvement of the apparatus as a whole. Later a simple system by which a rapid qualitative or quantitative examination of a regenerator system may be made and used as a rational basis of better design, will be presented and described.

Balance Not Representative

Unfortunately the Henry-McLoughlin balance was made in a furnace that was either of inferior fundamental design, was in bad physical shape, or poorly operated. The infiltration of atmospheric air between the air inlet and the regenerators on the outgoing end was 51.7 per cent of that required for combustion. In the Whigham test made 20 years prior, the infiltration within the same range was but 37 per cent. Nor was the fuel practice, representative of comtemporary operation, another indication of poor furnace condition.

The Kinney-McDermott balance is listed in column C, Table CXXIX. In this the producer gas fuel practice was excellent at the time made but should be about 15 per cent less at the present time to warrant a similar rating. However, the deficiency of combustion air before the regenerator probably was responsible for the low temperature of the furnace gases, 2374 degrees Fahr., entering the regenerator.

The germane figures of the Clements balance given in column D, Table CXXIX, indicate the temperatures found at the entrances of both the air and gas regenerators. It is difficult to reconcile the excellent fuel practice of this test and the high furnace gas temperatures at the regenerator inlets with the considerable length of heat and excess air.

Temperature values introduced throughout these works have been established on a basis of the value found in published papers of responsible writers, by certain other authoritative recorded data and as a result of observations. The data as used are listed appropriately in column E, Table CXXIX and the fol-

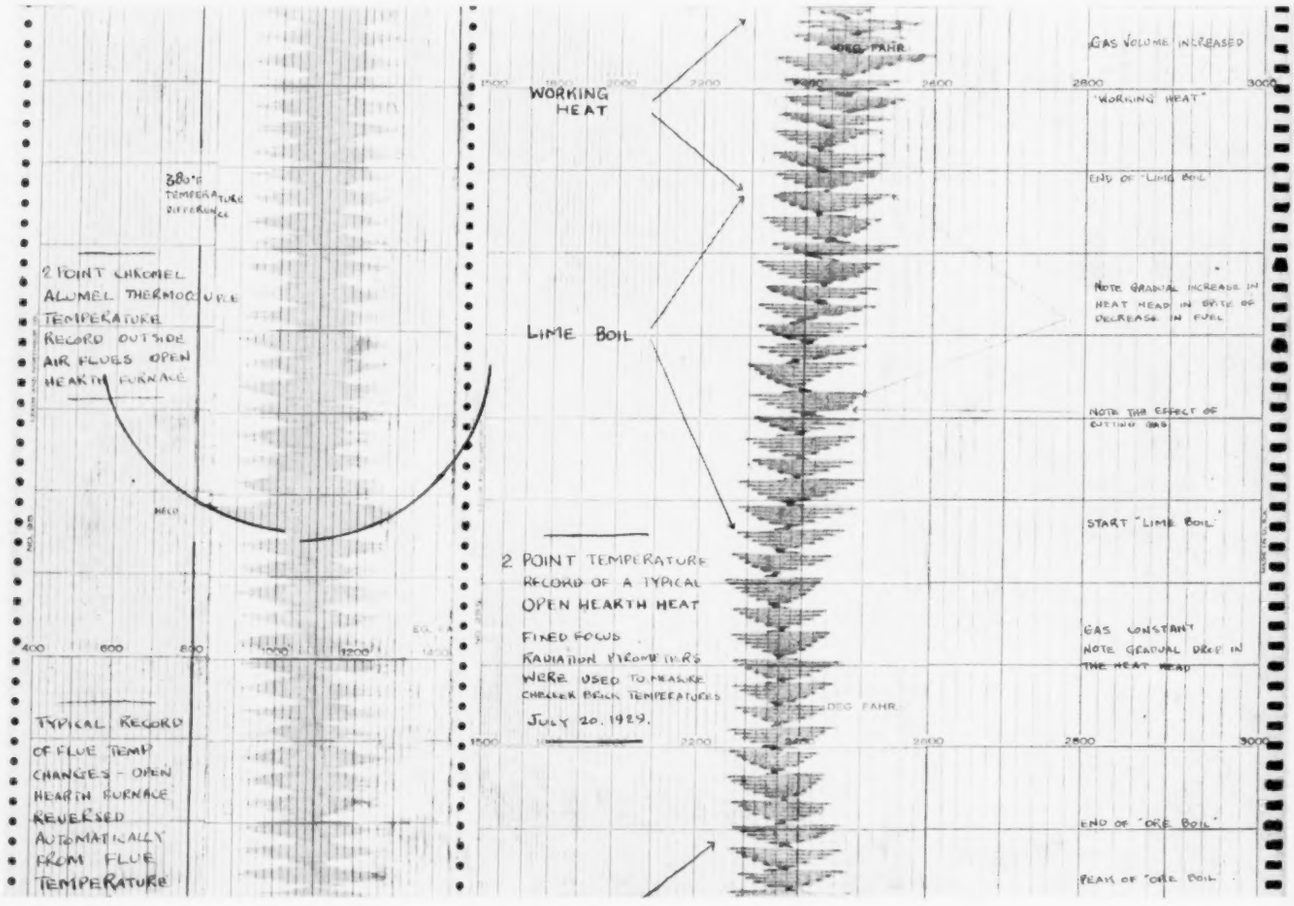

2 POINT CHROMEL ALUMEL THERMOCOUPLE TEMPERATURE RECORD OUTSIDE AIR FLUES OPEN HEARTH FURNACE
TYPICAL RECORD OF FLUE TEMP CHANGES - OPEN HEARTH FURNACE REVERSED AUTOMATICALLY FROM FLUE TEMPERATURE
WORKING HEAT
LIME BOIL
2 POINT TEMPERATURE RECORD OF A TYPICAL OPEN HEARTH HEAT
FIXED FOCUS RADIATION PYROMETERS WERE USED TO MEASURE CHECKER BRICK TEMPERATURES
JULY 20, 1929.
DEG. FAHR.
GAS VOLUME INCREASED
"WORKING HEAT"
END OF "LIME BOIL"
NOTE GRADUAL INCREASE IN HEAT HEAD IN SPITE OF DECREASE IN FUEL
NOTE THE EFFECT OF CUTTING GAS
START "LIME BOIL"
GAS CONSTANT
NOTE GRADUAL DROP IN THE HEAT HEAD
END OF "ORE BOIL"
PEAK OF "ORE BOIL"

Fig. 159—Chart for regenerator of 100-ton coke oven gas fired furnace, automaticaly reversed by temperature at outlet (left) and registering surface temperature at top of checker brick (right) near fantail connection

DEPENDABILITY

HOT AND COLD ROLLED WLSCo STRIP STEEL

The best thing we do here at West Leechburg is to make strip steel. It is the one product we make, and we put all our thought and energy and 38 years of experience into that.

The result is a dependable product containing whatever special characteristics are needed to best serve your purpose. We have concentrated on building up a prompt delivery service, because we don't wish to disappoint customers who depend on us.

So—our strip steel and our method of getting it to you are both dependable to a high degree. As a user of strip steel you would benefit by a contact with West Leechburg.

WE ALSO ROLL AND SELL ALL GRADES OF ALLEGHENY STAINLESS IN STRIP FORM

WEST LEECHBURG STEEL COMPANY

General Offices: UNION BANK BLDG., PITTSBURGH, PA.

Branch Sales Offices

NEW YORK . CHICAGO . DETROIT . CLEVELAND . DAYTON, OHIO . ST LOUIS . TOLEDO [Dean Higgins & Co.] . NEWARK [Edgcomb Steel Corp.] . PHILADELPHIA [Edgcomb Steel Co.] . TORONTO, ONT. [Jessop Steel Co.]
BUFFALO—ROCHESTER—SYRACUSE [Brace-Mueller-Huntley, Inc.]

Warehouse Stocks of Cold Rolled Strip Steel are carried by
JOS. T. RYERSON & SON

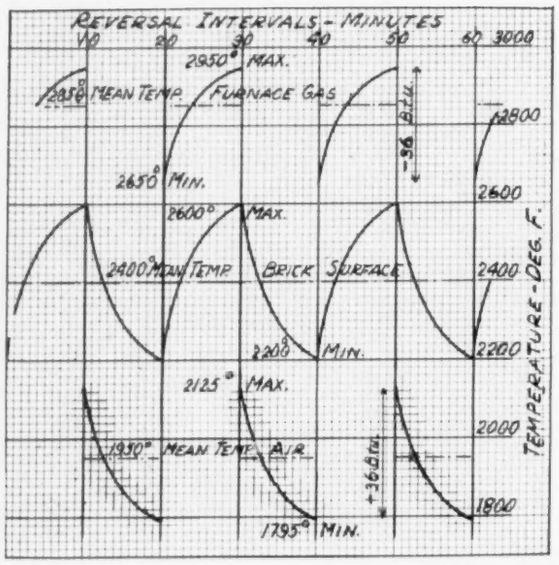


Fig. 160 — Diagram which shows the temperature relations at A_{11}—air regenerator

lowing is offered in substantiation of the correctness of the values.

Temperature requirements in the open-hearth are governed primarily by the temperature of the steel at tapping. The many findings of several observers agree closely that ordinary carbon steels containing 0.40 to 0.60 per cent carbon are at a proper temperature to tap when at about 2825 to 2850 degrees Fahr.; 0.10 to 0.15 per cent carbon steel at 2900 to 2925 degrees Fahr. and ingot iron, carbon at 0.04 per cent or less, at 2975 to 3000 degrees Fahr. As the great majority of steel manufactured is in the second classification the value of metal temperature was established at 2900 degrees Fahr., line 14.

In volume I (to be published later) it has been shown that with the poorly designed bottom of furnace G the temperature of the surface of the slag would be about 3088 degrees Fahr., but with the well-designed proposed bottom, XK, the slag surface temperature would be about 2986 degrees Fahr. From this data the value of 3000 degrees, line 13, was assumed as the slag surface temperature with 0.10 to 0.15 per cent carbon steel practice. Both of the values are consistent with the figures abstracted from the balances.

Figures Are Verified

The figures of maximum flame temperature, line 15, while arbitrary, have a measure of support in certain pyrometric readings. The Henry-McLoughlin value likely is low but that of Clements representative of practice of a few years ago. In the last few years the tight and perhaps insulated furnace, with better control of air and fuel, has brought about the condition termed "short flame" firing with which it is possible to burn an equal volume of fuel in a lesser length of flame travel. This has tended to increase the operating temperature of the flame while a better practice in controlling flame direction has allowed the furnace to be operated with the hotter flame without undue damage to the refractories.

If furnace gases were to cool below slag surface temperature before leaving the furnace (this condition is not unknown) then the bath would give up heat to the outgoing gases. Therefore, in correct operation the effluent gases must be at or above slag surface temperature. Accordingly, the temperature of the furnace gases leaving the furnace laboratory at A_2 has been assumed at 3050 degrees Fahr. (not listed) and at the entrance of the downtakes As, line 17, as 3000 degrees Fahr. for all types of firing.

Lower Temperatures Apply

If higher carbon steel is made then all of the previously mentioned temperatures (except flame) would decrease in the approximate order of the difference in metal tapping temperatures, and in ingot iron practice would increase in the same order.

The next important temperature to be established is that of the furnace gases at the regenerator entrances A_{12}. The low temperature here in the Whigham balance, line 18, is attributed to the considerable excess air present, line 25, and in the Henry-McLoughlin and Kinney-McDermott balances to the probable fact that brickwork rather than gas temperatures were indicated as well as to the effect of excess air in the first mentioned and the deficiency of air in the second.

The temperature conditions noted in the Clements balance more nearly indicate the true gas temperatures existing. The value of 2850 degrees Fahr. as used is representative of all fuel practice with a high order of furnace design and operation. While the value was arrived at primarily by calculation it is based on several observations and may be substantiated from the data of the chart, Fig. 159.

Furnace Reversed Automatically

The 100-ton furnace by which this record was made was reversed automatically from temperature difference at thermocouples located in the connecting flues adjacent to areas A_{12}. This temperature record is at the left and does not enter into the immediate discussion. The chart at the right is that of the temperature of the upper surface of the checker brick taken at the regenerator entrance near areas A_{11}. The furnace was operating on coke oven gas which has but minute properties of heat radiation and as the instrument used to determine the temperature was of the radiation type it follows the temperature must be almost entirely that of the brick surfaces. The extreme temperature range of that portion of the chart reproduced is about 2200 degrees low, 2600 degrees high, with an apparent mean of about 2400 degrees Fahr.

If the brick surface temperature cycle of one side is plotted about a 2400-degree mean temperature line as in Fig. 160, and the furnace gas temperature calculated about the 2850-degree mean temperature line, it then becomes possible to calcu-

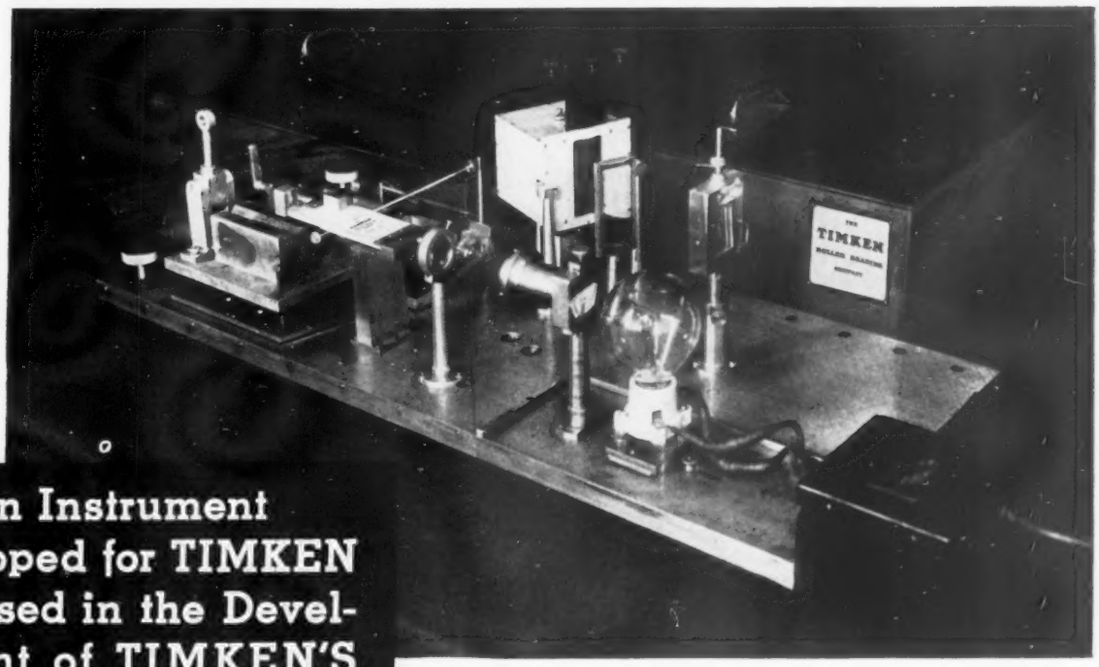
Table CXXX

Representative Furnace Gas Analyses

(Hand-Controlled Operation)

	CO_2, per cent	O_2, per cent	CO, per cent	Air Condition, per cent + or −
Producer Gas: (Downtakes, As, 21 samples taken over four days operation)				
High (After hot metal)	22.6	0.0	3.0	− 8
Average 21 samples	18.5	0.6	0.3	+ 3
Low (During melt down)	16.0	1.6	0.0	+ 8
Average of 12 Samples: (Different Plant)				
Downtakes (As)	16.1	0.9	0.3	+ 3
Before W. H. boiler	11.6	2.6	0.2	+12
Before exhaust fan	8.3	10.4	0.0	+93
Oil Fuel: (Average 16 Samples)				
Downtakes (As)	15.5	0.5	0.0	+ 2
After regenerators (A12)	14.2	1.2	0.0	+ 6
After reversing valve	13.0	2.0	0.0	+ 9
After W. H. boiler	9.0	8.0	0.0	+58

the "PROFILOGRAPH"



An Instrument Developed for TIMKEN and Used in the Development of TIMKEN'S Amazing New "Mirror Finish". Measures to One Millionth of an Inch (.000001")

The "Profilograph" operates on a simple optical-mechanical principle. Essentially it consists of (1) a fine diamond point which acts as a tracer or detector, moving over the surfaco of the specimen being measured. (2) an optical system which magnifies the movements of the detector. (3) a camera which permanently records the magnified movements of the detector.

In order to record irregularities in the finely-ground surfaces of Timken Bearings, a vertical magnification of 2000 to 1 is used. This permits the accurate measurement of irregularities down to 1 to 2 millionths of an inch.

» «

TIMKEN Bearings have always been noted for the finely-finished surfaces of the rollers and races. Now Timken has gone still further and produced contact surfaces of such extreme fineness that only the term "mirror finish" can adequately describe them.

The main obstacle to obtaining such ultra fine finishes heretofore has been the absence of any instrument capable of accurately determining the extent and nature of the minute surface irregularities left by the action of cutting tools and grinding wheels. The development and perfection of the "Profilograph' has removed that obstacle.

As its name indicates, the "Profilograph" measures and records the profile of any finished or semi-finished surface, showing the peaks, medials and valleys in highly magnified form.

Since these initial irregularities, in Timken Bearings, represent an average surface variation of only a few millionths of an inch, it is evident that extreme precision is required in the measuring instrument. As a matter of fact, the "Profilograph" can detect and measure surface irregularities to within one millionth of an inch.

This improvement in finish is now being applied in the manufacture of Timken Bearings, but as considerable new equipment is required, its application to our entire production must necessarily be gradual.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN *TAPERED ROLLER* BEARINGS

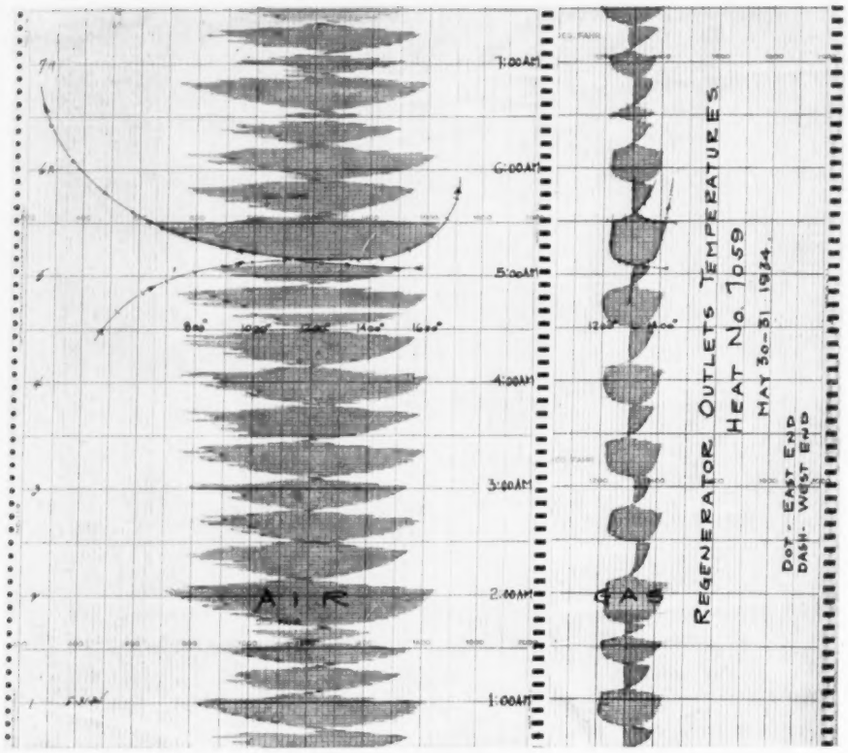


Fig. 161—Charts of regenerator outlet temperatures on 125-ton producer gas fired furnace, manual control. Temperatures from air regenerators, left; and gas regenerators, right

late the complementary air temperature. Obviously with the furnace operating in temperature equilibrium, the reduction of waste gas temperature at any point indicates a definite transfer of heat from the gases to the brick which will be in the order of the unit heat carrying capacity of the gases at the indicated temperatures. Since the air or preheated fuel in order to maintain the equilibrium must receive an equal amount of heat in passing counter and with the heat recorded by the counter flowing fluid determined, its temperature range may be calculated with considerable accuracy and its location in the temperature scale found. Thus, if the brick surface temperature is recorded correctly and the mean temperature of the air in agreement with the data the approximate correctness of the entering furnace gas is substantiated.

Gas Analysis Important

Furnace gas composition enters into temperature conditions throughout the system. In arriving at typical combustion condition it is assumed that operation is good and that condition, which easily may be achieved with only fair furnaces, can be duplicated in any furnace that is suitable for economical ingot production. The furnace gas analyses of Table CXXX chosen at random from many examples of hand-controlled operation are used as the basis of average conditions for any hypothetical thermochemical calculations.

Because of the common use of thermocouples and recording pyrometers at the regenerator outlets, A_1, much information is available as to temperature conditions of all the fluids passing at these locations as well as brick surface temperatures.

Obviously, the temperatures of the furnace gases will be influenced greatly by regenerator chamber size and checkerwork exchange surface and draft as well as by the type of fuel used and the combustion practice of the plant. In addition the condition of the checkerwork resulting from dust and/or temperature is an important factor of temperature qualification.

As examples of usual temperature conditions at the regenerator outlet the record at the left of the chart of the 100-ton coke oven gas fired furnace, Fig. 159, should be examined for this type of firing. The approximate mean temperatures of the furnace gas and air will lie at the asymptotes of hyperbolic curves extended from the recorded temperatures as indicated. Thus furnace gas temperatures and the entering air temperatures would be expected to lie from about 200 to 300 degrees Fahr. respectively, above and below the maxima and minima recorded.

Operations Are Charted

The chart of a 125-ton producer gas fired furnace manually operated is presented in Fig. 161. The temperature range in the air regenerators as indicated at the left is 800 to 1580 degrees with the mean at about 1250 degrees Fahr. The chart from the gas regenerators at the right shows that at the east end the producer gas was entering the regenerators about 100 degrees hotter than at the west end. This condition results from a difference in the lengths of the hot gas mains. The range of temperature at the west end is about 1320 to 1440 degrees and at the east end 1220 to 1410 degrees with mean values of 1365 and 1300 degrees Fahr., respectively.

The constructed curves plainly show that little increase of temperature would develop from an increase in time of reversal but that the loss of temperature would be considerable if the time interval was increased.

The chart, Fig. 162, is from a 100-ton natural gas fired furnace having automatic reversal from temperature

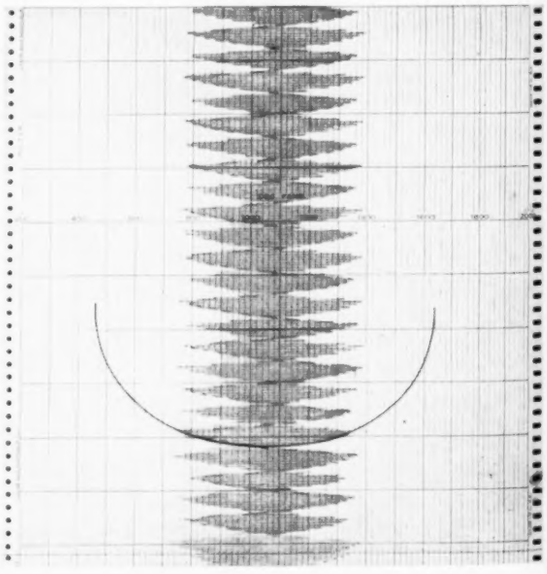


Fig. 162 — Chart from outlet of regenerators of 100-ton natural gas fired furnace. Automatic reversal of furnace from this instrument

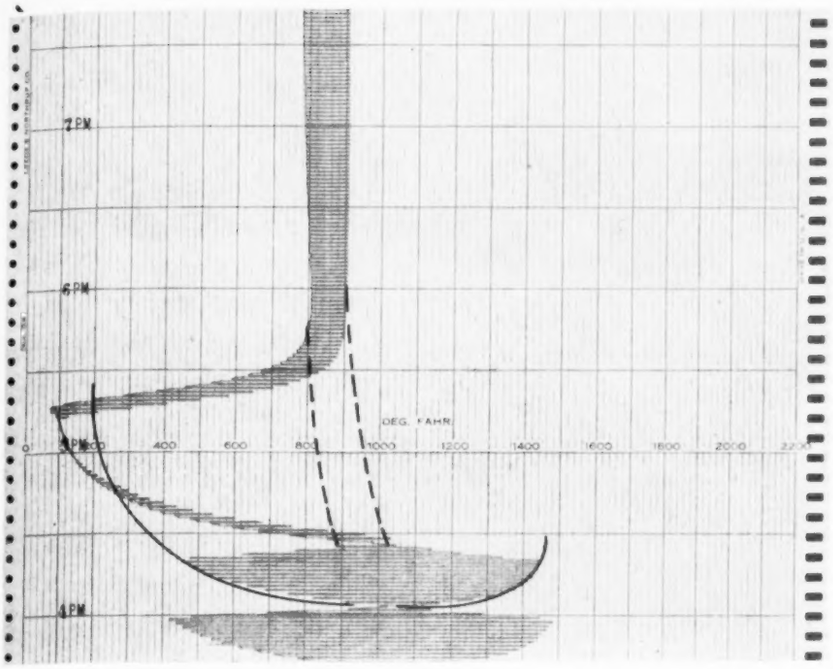


Fig. 163—Chart of regenerator outlet temperatures at shutdown of oil-fired furnace, indicating the temperature of brickwork

difference. This chart as well as that of Fig. 159 shows plainly the stability of operations when this excellent feature of automatic control is installed. From this chart it is seen that the temperature range is from about 760 to 1380 degrees at a mean temperature of about 1080 degrees, but the constructed curves indicate the fluid temperatures to be 200 to 300 degrees Fahr. higher than the recorded temperatures. This is shown in Fig. 162.

The chart of the oil fired furnace, Fig. 163, gives excellent information as to the brickwork temperatures at the furnace outlets. This furnace was shut down about 4:30 p. m. and the thermocouples then were removed, being replaced about 5.15 p. m. At 6 p. m. there being no circulation within the furnace system the couples then measured only the temperature of the brickwork. The brick temperatures then were reconstructed from the time of the shutdown by means of the dotted lines. The higher of these temperatures is of the side that was on heat at the shutdown, while the lower is of the side that was on air.

(To be continued)

Steel Mill Engineers Discuss Bearings

(Concluded from Page 50)

cent or more thus reducing unit bearing pressures, increasing bearing life and providing a more rigid roll and increased roll life. Under proper operating conditions, the speaker stated, the roll neck temperature remains constant at about room temperature which makes for rolling to closer tolerances and fewer mill adjustments.

The speaker cautioned that there should be flexibility in the water supply if the proper rate of heat dissipation is to be maintained without varying load conditions. He explained that as the temperature of the water increases, its viscosity decreases and it has less strength to serve as separating medium between the bearing and the journal, as work done in the bearing increases, the heat to be carried away increases. He advocated conical shaped spray nozzles inasmuch as they save as high as 50 per cent water and they necessitate the installation of fewer sprays.

Laminated bearings, according to H. M. Horne, micarta products department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., effect power savings ranging from 25 to 50 per cent, eliminate the use of grease and the cost of applying it, hold the gage more accurately, reduce the number of trial bars when the rolls are changed and afford 20 to 40 times longer life than metallic bearings. Mr. Horne stated briefly the various steps in the development of micarta bearings and mentioned in conclusion that practically every type of iron and steel rolling has been accomplished successfully with this type of bearing, showing considerable power savings and other advantages.

In discussing Morgoil, or oil flooded bearings for roll necks, J. H. Hitchcock, engineer, Morgan Construction Co., Worcester, Mass., mentioned several applications which merited particular attention. In one case, that of a continuous hot strip mill, the application of this type of bearing afforded a power saving ranging from 45 to 60 per cent as compared to previous practice of the same rolling schedule, the operators crediting the bearings with an increase of 1½ per cent in the average yield.

Depends Upon Viscosity

Straight mineral oils increase in film strength as their viscosity or body increases but in the case of extreme pressure lubricants viscosity does not seem to be so important. This was the contention of O. L. Maag, lubrication engineer, Timken Roller Bearing Co., Canton, O. In speaking on "Development of Specifications for Lubricants" Mr. Maag mentioned that tests on extreme pressure lubricants indicate that those which show a decrease in load carrying capacity during a six hour test under a 20,000 pound per square inch load also showed a decrease in sulphur or chlorine content, and that lubricants compounded from a well-refined mineral oil and an extreme pressure base such as a chlorinated fatty oil are more stable than those made from dark unrefined oils.

The primary functions of a lubricant in antifriction bearings are to dissipate heat, aid in keeping foreign matter such as water and scale out of the bearings, and to prevent rust and corrosion. Heat may be caused by overloading, poor ventilation, the use of too much or too little lubricant, or by the use of a lubricant of the wrong consistency for the application.

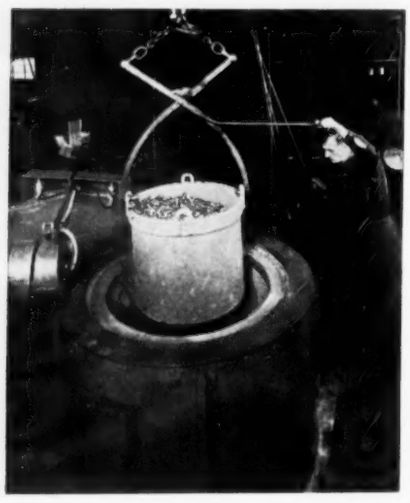
Increasing the sulphur content in an extreme pressure lubricants, the speaker warned, increases the abrasive properties, while increasing the chlorine content apparently reduces the abrasion while at the same time increasing the load carrying capacity. Lead, hexachlorethane, chlorinated retene, and certain other definite chemical compounds including phosphates likewise have shown possibilities in the extreme pressure field.

In the selection of a lubricant, the bearing size, speed, temperature, load and general operating conditions all must be considered with the most adverse conditions as the governing factor, the speaker contended. For bearings over 6 inches outside diameter, the speaker recommended medium to medium soft consistency greases up to speed of 500 revolutions per minute. He considers oil the better lubricant at speeds above 500 revolutions per minute.

NEW EQUIPMENT

Tempering Furnace—

Leeds & Northrup Co., 4901 Stenton avenue, Philadelphia, recently introduced a new dense load "Homo" tempering furnace, shown herewith. The unit is cylindrical and stands at a convenient height, work being placed into the furnace and removed through the top. In its base is a special fan which forces the air past the coils through the work. Operation is entirely automatic. A control panel regulates the fan and current input to bring the work up to temperature in the shortest possible time and to put it through as long as desired without over-shooting or



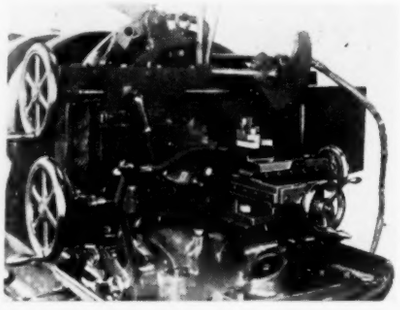
Leeds & Northrup dense load Homo tempering furnace

falling away. This furnace is employed for extra dense loads such as steel balls, small bolts and rivets, etc. It is a modification of the "Homo" furnace now used widely on ball races, larger rivets, bolts, screw machine products, forgings, stampings, etc.

• • •

Beveling and Facing Attachment—

Landis Machine Co., Inc., Waynesboro, Pa., is introducing a new pipe facing and beveling attachment for its pipe threading and cutting machines. This device is designed to accommodate a new type of screwed



Landis pipe facing and beveling attachment installed on pipe threading and cutting machine

joint which requires that in addition to the threading operation, the pipe be faced and beveled 20 degrees on the inside diameter, and be recessed at the shoulder of the thread.

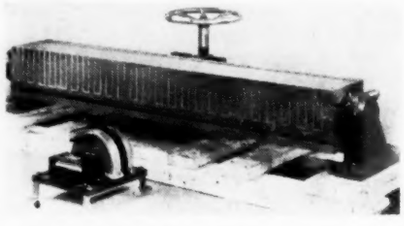
While the machine itself is of the standard type, the attachment is built directly into the machine which also is fitted with a leadscrew. The accompanying illustration shows a close-up view of the crossrail of the machine with the attachment in place.

The facing and beveling attachment is equipped with adjustable cutting tools, the setting of which remains constant once properly adjusted. The leadscrew provides the positive feed necessary to insure threads of correct form and lead. This is particularly important on the larger diameters since the threads are straight and not tapered as in the case of the ordinary screw joint.

• • •

Swivelling Magnetic Chuck With Central Control—

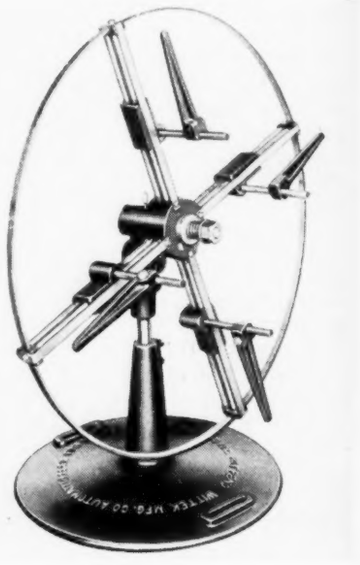
O. S. Walker Co. Inc., Worcester, Mass., has brought out a 10½ by 10½ by 78 swivelling magnetic



Walker swivelling magnetic chuck with central control

chuck with central control. Both faces have tee slots for locating or clamping work if necessary. The magnetic surface on the face of the chuck, shown herewith, is 7½ inches wide, and on the top face 6¾ inches wide, this magnetic surface being uninterrupted over the edge of the chuck for the entire length of 14 inches.

Patterns and drawings are available for these chucks up to 206 inches length of magnetic surface. This type of unit is suitable for use



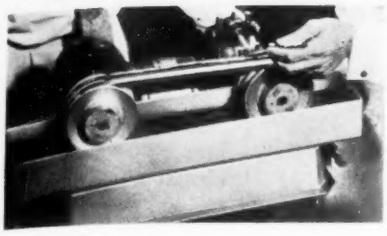
Wittek automatic self-centering reel for holding coil stock

on all makes of face grinders operating in factories producing machine knives, plain shear blades, flying shear blades, etc.; also in rolling mills and other plants where regrinding operations are to be performed.

• • •

Automatic Self-Centering Reel Stand—

Wittek Mfg. Co., Chicago, is offering a new automatic self-centering reel for holding coil stock. This reel stand, shown herewith, is equipped with four automatically expanding coil holders which slide up or down on the radial arms by means of aux-



Dayton Rubber's new oilproof V-belt is shown in the foreground undamaged after extended oil bath

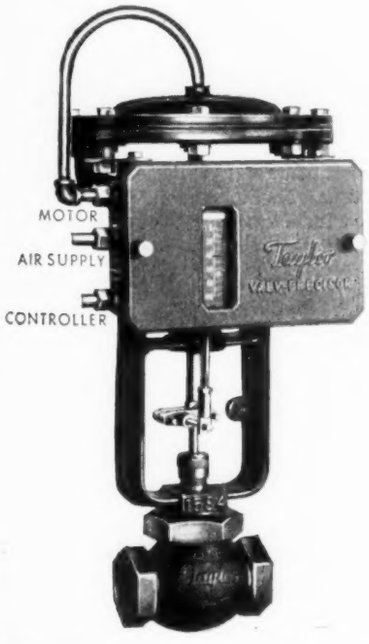
iliary threaded shafts rotated through gears simply by turning the reel to the right or left with the gears in mesh. When adjusted to the desired diameter the gears are disengaged and locked into position by shifting the control lever on the gear box.

The four coil holders always are equal distance from the center; therefore the coil always is centered. This heavy duty reel will hold coils up to 500 pounds in weight, and with from 9 to 28-inch open centers.

• • •

Precision Valve Action Unit—

Taylor Instrument Cos., Rochester, N. Y., are announcing a "Valv-Precisor," a precision valve action unit applicable to any diaphragm valve. The device, shown herewith, is recommended on all processes which have time lags or heat capacities demanding a low or medium controller sensitivity, provided that load changes are negligible or infrequent. This compact unit also can be used in conjunction with air-operated controllers. The manufacturer claims that any air-operated controller with the aid of the "Valv-Precisor," can position the valve disk 50 times more accurately when opposed by valve stem friction and diaphragm-motor hysteresis than when the device is not used. Naturally, this increased accuracy is reflected in the greatly improved control obtained.

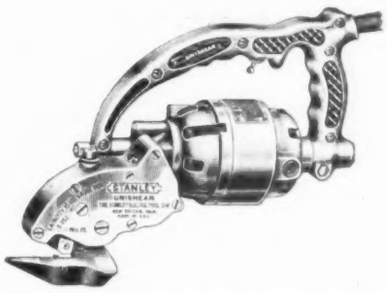


Taylor "Valv-Precisor" is applicable to any diaphragm valve

• • •

Oilproof V-Belt—

Dayton Rubber Mfg. Co., Dayton, O., announces an oilproof V-belt for application in the machine tool and other industries where excessive oil in connection with power transmission long has been a problem. The "Daycoil" V-belt, shown herewith, embodies the same laminated construction principles as the company's regular cog-belts for general transmission application, plus, however, the specially designed casing of a new synthetic compound to resist oil. "Dayco," the oilproof material used in the construction of these belts has all the properties of natural rubber, such as flexibility, plasticity and resiliency, in addition to aging properties many times that of rubber, and much greater abrasive and wearing qualities when subjected to oils and solvents, the company claims.



Portable, electric shear known as the Stanley "Unishear" No. 16

• • •

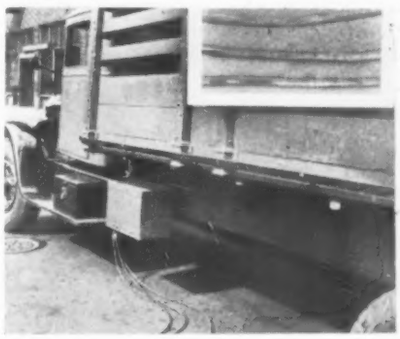
Welding Cable—

Lincoln Electric Co., Cleveland, recently developed a new type of welding cable to meet conditions of extremely severe wear and abrasion. Known as "Realwear," the cable consists of fine tinned copper wire laid in ropes and stranded. Individual ropes are alternated in succession as regards the direction of the lay to prevent distortion in applications of severe usage. The conductor of the cable is insulated with an especially developed rubber compound to provide firm adhesion between the cover and rubber insulation. High grade cotton woven on a loom and securely joined to the rubber belt by a special process forms the cover which is provided with a finish that is resistant to oil, grease, acid, gasoline, moisture and heat. The cable is supplied in sizes 2, 1, 0, 00, 000, 0000.

• • •

Portable Electric Shear—

Stanley Electric Tool Division, Stanley Works, New Britain, Conn., is bringing out a new portable electric shear. This unit, shown herewith, is designed primarily for shops engaged in production work on tough sheet materials or for job shops that cut up to 16 gage hot rolled steel. Features include speed up to 15 feet per minute; cutting of straight lines, curves, angles and notches with hairline accuracy and without burr or distortion; inside cuts made easily after punching a 2-inch hole for the yoke; and cutting of circles or curves with a radius as small as 1½ inches.



Remarkable resistance to wear was shown by Lincoln welding cable in test made by dragging it over pavement for 20 miles

• • •

Surface Grinder—

Brown & Sharpe Mfg. Co., Providence, R. I., has developed a new design hydraulic grinder which provides a rugged machine for surface grinding in both the toolroom and on the manufacturing floor. To assure maintenance of accuracy in the finished work, particularly rigid support has been given to the table. In addition, the wheel spindle is carried in a vertical slide of unusual width and length, assuring accurate alignment.

The spindle unit is of the cartridge type, easily removed for adjustment. The table is hydraulically operated, providing any desired longitudinal feed up to 60 feet per minute and any desired rate of automatic transverse feed up to 0.15-inch per reversal of longitudinal travel. Handwheels are provided for both movements to facilitate rapid settings. The wheel spindle is driven by a 1½-horsepower motor, mounted at the lower end

of the wheel slide—a separate motor being used to operate the pump for the hydraulic feeds of the table. Capacity of the machine is as follows: Grinds work to 24 inches long, 8 inches wide and 11 inches high, using a wheel 10 inches in diameter.

• • •

Temperature Control—

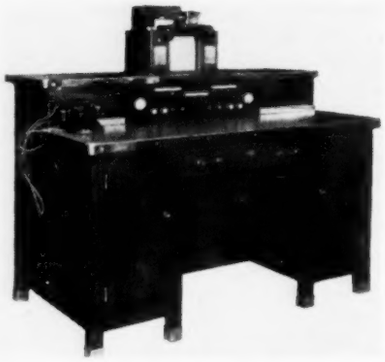
Edison Electrical Controls divisions of Thomas A. Edison Inc., West Orange, N. J., have brought out a new temperature control for use on water cooled internal combustion engines. This device is completely sealed in a glass tube from which all air has been evacuated and replaced by an inert gas. Consequently the contact points cannot oxidize or become pitted by repeated operation. The temperature control for engines, catalog M6-D8, consists of this sealed control mounted in a metal tube provided with a standard pipe thread and a suitable junction box for electrical connections.

Brown & Sharpe hydraulic surface grinder of rugged design

• • •

Central Control Units—

Autocall Co., Shelby, O., has developed central control units, one of which is shown herewith, for plant protection signaling systems. A desk of this type produces printed records and gives alarm indication for automatic sprinkler systems, watch patrol systems, supervises temperatures, pressures, liquid levels, continuity of operation, and performs many other supervisory duties. A simplified electrical circuit connects the transmitting mechanisms that are located adjacent to the point being supervised, to the recording desk.



This Autocall central control unit has wide industrial use

• • •

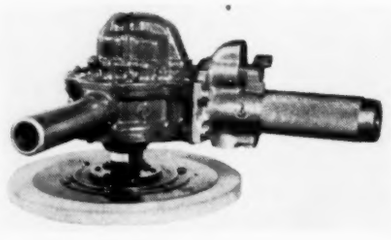
Welding Torch—

Bastian-Blessing Co., 240-258 East Ontario St., Chicago, is marketing a new SX universal welding torch adapted to a wide variety of manufacturing operations such as light sheet metal work, light brazing and silver soldering, aircraft, automobile, metal door, furniture and tank welding. Because of the light weight of this device, shown below, it is especially desirable for continuous operations where fatigue of the operator controls production output. Tips and goosenecks are of small size to permit working in close quarters.

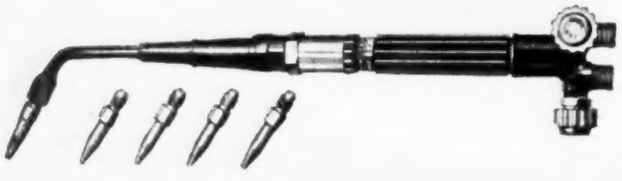
• • •

Disk Sander—

Rotor Air Tool Co., Cleveland, recently brought out a disk sander designated type B-1. Shown herewith, the unit carries a 9-inch sanding pad and weighs 10 pounds. A new type of 4-part quick-acting governor controls the free speed and appreciably reduces air consumption while the tool is running idle. This tool is made in several different speeds suitable also for use with cup-shape wire brushes and cup-shape grinding wheels.



Above—Rotor Air Tool disk sander



Left — Bastian-Blessing SX universal welding torch

• • •

Electroplaters' Microscope—

Bausch & Lomb Optical Co., Rochester, N. Y., is announcing a new electroplaters' microscope for rapid and accurate measurement of plate depth. The instrument, shown herewith, consists of a monocular microscope stand equipped with fine and coarse adjustments, an achromatic objective, a Filar micrometer eyepiece, vertical illuminating unit, and a mechanical stage for correctly locating the specimen in the field of the optical system. The micrometer eyepiece has a movable hair actuated by a micrometer screw with a drum graduated in 100 divisions. The tube length is also of such a value that each least division on the drum of the micrometer will equal 0.00001-inch on the specimen. This makes measurements easy, even for those unskilled in microscopic practice.

Electroplaters' microscope announced by Bausch & Lomb Optical Co.

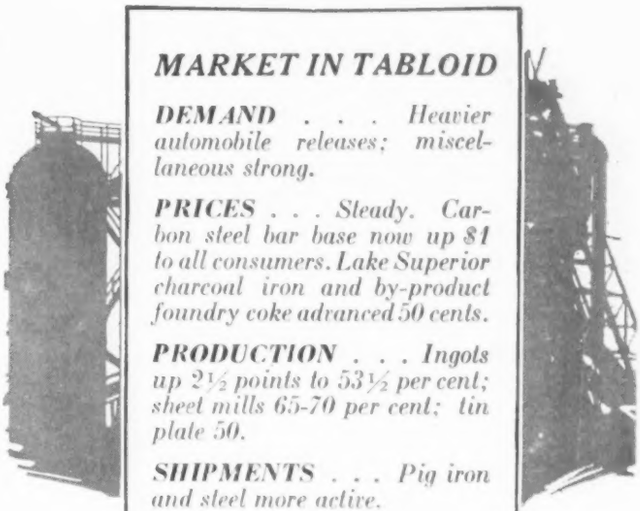
• • •

Bending Rate In Error

In describing the new bending machine developed by Wallace Supplies Mfg. Co., Chicago, mention was made of the fact that production with one operator was "three to five bends per hour." This information was supplied incorrectly by the manufacturer; the statement should have read "three to five bends per minute." This is the rate maintained on furniture steel; on smaller sizes of exhaust tubes production is stated to be 30 to 60 bends per hour.

Heavier Auto Releases Reverse Steel Trend

Rate Advances 2½ Points; Markets Strong; War Affecting Raw Materials



MARKET IN TABLOID

DEMAND *. . . Heavier automobile releases; miscellaneous strong.*

PRICES *. . . Steady. Carbon steel bar base now up $1 to all consumers. Lake Superior charcoal iron and by-product foundry coke advanced 50 cents.*

PRODUCTION *. . . Ingots up 2½ points to 53½ per cent; sheet mills 65-70 per cent; tin plate 50.*

SHIPMENTS *. . . Pig iron and steel more active.*

GAINING momentum in production of new models, automobile manufacturers last week released heavier steel tonnages, which with strongly sustained demands from diverse consuming interests led to a vigorous rebound in steelworks operations, up 2½ points to 53½ per cent.

Sheet and strip mills were correspondingly accelerated, and following two weeks' general decline in ingot and finished steel output, this was believed by steelmakers to mark the turning point, from which activity is expected to show a gradually mounting trend.

This week practically all automobile companies will be assembling 1936 series, and will endeavor to push up schedules as rapidly as possible. Last week 25,000 units were made, 10,000 more than in the preceding week.

Though of secondary importance in the current markets, interest was keen in the probable affects of the Italo-Ethiopian war on iron and steel in this country. So long as hostilities are confined to Ethiopia it was generally believed there will be little increase in demand for finished steel. In fact, the first consequences are more likely to be to the disadvantage of American steelmakers, as the principal imports of manganese ore and considerable iron ore pass through the Mediterranean sea, high insurance rates strengthening prices.

Awaiting full interpretation of this government's embargo on war materials, scrap commitments for export fell off considerably, and as a consequence eastern scrap prices were lower. On the other hand, Italy purchased a Clyde-Mallory line (American) freighter for scrap, despite reports that it has accumulated large stocks of scrap and other raw materials.

In this country, demand for pig iron increased substantially, with rising foundry operations and heavier shipments in most districts, and imports of 10,000 tons. Machinery builders again appeared among leading buyers of domestic iron.

In heavy finished steel, specifications for structural shapes were larger, but new awards dropped to 20,665 tons, including 6950 tons for a bridge at Homestead, Pa. In the New York metropolitan area 20,000 tons are up for bids. Los Angeles is about to place 19,000 tons of reinforcing bars for a pipe line. As only one shipbuilder submitted a bid to the navy for a cruiser requiring 6500 tons of steel, new tenders may be taken.

For 500 hopper cars Norfolk & Western has decided to build in its Roanoke, Va., shops 6000 to 7000 tons of steel will be required. Cincinnati, New Orleans & Texas Pacific has purchased 200 automobile cars in addition to 300 recently ordered. Chesapeake & Ohio has placed 21,842 tons of rails.

The advance of $1 a ton in the base price of carbon steel bars which became generally applicable Oct. 1 drove in comparatively little tonnage, as with the new quantity deductions users still are able to obtain bars at a lower price than the former base. Lake Superior charcoal iron, and by-product foundry coke, have been raised 50 cents a ton.

Daily average pig iron production in September, 59,009 gross tons, was 4 per cent higher than in August, and largest since June, 1934. Total for the month, 1,770,259 tons, was 6 per cent over August. For nine months, output of 14,880,315 tons is 14 per cent larger than in the same period last year. At the close of September 104 stacks were in blast, a net gain of six.

Pittsburgh steelworks operations last week were up 2 points to 48 per cent: Chicago 1 to 60; eastern Pennsylvania 1½ to 37; New England 11 to 66; Buffalo 5 to 52; Youngstown 2 to 56. Wheeling was unchanged at 81; Birmingham 55½; Detroit 94. Cleveland was down 5 to 62.

STEEL's iron and steel price composite is off 1 cent to $32.82, due to lower scrap prices, while the scrap index itself is down 4 cents to $12.75. Finished steel composite remains $53.70.

COMPOSITE MARKET AVERAGES

	Oct. 5	Sept. 28	Sept. 21	One Month Ago Sept., 1935	Three Months Ago July, 1935	One Year Ago Oct., 1934	Five Years Ago Oct., 1930
Iron and Steel	$32.83	$32.84	$32.83	$32.82	$32.44	$32.10	$32.35
Finished Steel	53.70	53.70	53.70	53.70	54.00	54.00	50.13
Steelworks Scrap	12.75	12.79	12.79	12.65	10.64	9.40	12.32

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Oct. 5, 1935	Sept. 1935	July 1935	Oct. 1934
Finished Material				
Steel bars, Pittsburgh	1.85c	1.85c	1.80c	1.80c
Steel bars, Chicago	1.90	1.85	1.85	1.85
Steel bars, Philadelphia	2.16	2.11	2.11	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.55
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.40	2.40	2.60	2.60
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$28.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	28.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	27.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

	Oct. 5, 1935	Sept. 1935	July 1935	Oct. 1934
Pig Iron				
Bessemer, del. Pittsburgh	$19.81	$19.81	$19.81	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	19.76	19.81	19.81	19.76
No. 2 foundry, del. Pittsburgh	19.31	19.31	19.31	19.26
No. 2 foundry, Chicago	18.50	18.50	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	20.68	20.68	20.68	20.63
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	18.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.75	24.25	24.25	24.04
Ferromanganese, del. Pittsburgh	90.13	90.13	90.13	89.79
Gray forge, del. Pittsburgh	18.67	18.67	18.67	18.80
Scrap				
Heavy melting steel, Pittsburgh	$13.75	$13.45	$12.30	$10.50
Heavy melt. steel, No. 2, east. Pa.	11.00	11.25	10.50	8.00
Heavy melting steel, Chicago	12.50	12.55	10.40	8.75
Rails for rolling, Chicago	14.00	13.90	11.25	9.90
Railroad steel specialties, Chicago	13.75	13.75	12.00	9.75
Coke				
Connellsville, furnace, ovens	$3.55	$3.25	$3.30	$3.60
Connellsville, foundry, ovens	4.30	4.00	4.25	4.60
Chicago, by-product foundry, del.	9.75	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.18c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.43c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.08c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

(Base, 5 to 25 tons)

Pittsburgh	1.85c
Chicago or Gary	1.90c
Duluth	2.00c
Birmingham	2.00c
Cleveland	1.90c
Buffalo	1.95c
Detroit, delivered	2.00c
Pacific ports, f.o.b. cars, dock	2.40c
Philadelphia, del.	2.16c
Boston, delivered	2.27c
New York, del.	2.20c
Pitts., forg. qual.	2.10c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.91c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight carloads; less than straight carloads take trade quantity extras; 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.	
Standard wire nails	$2.40
Cement coated nails	2.40
Galvanized nails, 15 gage and coarser	4.40
do. finer than 15 gage	4.90

(Per pound)

Polished staples	3.10c
Galvanized fence staples	3.35c
Barbed wire, galv.	2.80c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$58.00

To Manufacturing Trade

Plain wire, 6-9 gage	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20
4100 0.15 to 0.25 Mo			0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni.			1.05
5100 0.80-1.10 Cr			0.45
5100 Cr. spring			base
6100 bars			1.20
6100 spring			0.70
Cr., Ni., Van.			1.50
Carbon Van.			0.95
9250 ....Carbon base plus extras			

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23¾-in.	
Pittsburgh	1.85c
Chicago or Gary	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop,	
Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip,	
Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	75 off
Rolled thread, ½ x 6, smaller	75 off

Machine Bolts

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts stud bolts	75 off
Tire bolts	60 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	75 off
Step bolts	70 off
Elevator bolts	70 off

Nuts

S.A.E. semifinished hex.; ½ to ⅞-inch	75 off
Do., ½ to 1-inch	75 off
Do., over 1-inch	70 off

Hexagon Cap Screws

Milled	85-10 off
Upset, 1-in., smaller	85 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less, Chicago del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

In.	Blk.	Gal.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
⅛	31½	15
¼	36½	20½
⅜	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
⅛, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		Charcoal Iron	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935 card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

*Connellsville, fur.	$3.55- 3.70
*Connellsville, fdry.	4.30
*Connell. prem. fdry.	5.30- 5.65
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
*Chi., ov., outside del.	9.00
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.50
*Cleveland, del.	9.75
Buffalo, ovens	7.50- 8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

Tank lots	Spot
Pure and 90% benzol	15.00c
Toluol	30.00c
Solvent naphtha	30.00c
Commercial xylol	30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

*Western prices, ½-cent up

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	20.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.08	.....	18.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm.	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40,	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O.	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.57	19.57	19.07	20.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10,	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem	20.99	21.49	.....	.....
Philadelphia from Birmingham	19.93	.....	19.1	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	19.00	19.00	18.50	.....
St. Louis from Birmingham	†18.62	.....	18.50,	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63.

Gray Forge		Charcoal	
Valley furnace	18.00	*Lake Superior fur.	21.50
Pitts. dist. fur.	18.00	* Do., del. Chicago	24.75
		Lyle, Tenn.	21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon: 2 to 3%, $1 per ton additional; each unit over 3%, $1 per ton additional.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality

Pa., Ill., Md., Mo.	$45.00
Alabama, Ga.,Ky.,	$40.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Ga., Ala.	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	45.00
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$18.75-19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$14.50

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsb'gh	90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent Spot, $5 a ton higher.	126-130.00
Silicoman., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro. del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York	Lead: East St. L.	Zinc: St. L.	Aluminum 99%	Antimony: Chinese Spot, N. Y.	Nickel: Cathodes
Sept. 28	9.00	9.12½	8.60	49.87½	49.10	4.50	4.35	4.75	*19.00	14.50	35.00
Sept. 30	9.00	9.12½	8.60	50.25	49.45	4.50	4.35	4.75	*19.00	14.25	35.00
Oct. 1	9.00	9.12½	8.60	50.15	49.00	4.50	4.35	4.75	*19.00	14.25	35.00
Oct. 2	9.00	9.12½	8.60	49.12½	48.10	4.50	4.35	4.75	*19.00	14.25	35.00
Oct. 3	9.00	9.12½	8.60	49.40	48.50	4.50	4.35	4.75	*19.00	14.25	35.00
Oct. 4	9.00	9.12½	8.60	50.25	48.60	4.50	4.35	4.75	*19.00	14.25	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets

Yellow brass (high)	14.37½
Copper hot rolled	16.00
Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50

Tubes

High yellow brass	16.37½
Seamless copper	16.50

Rods

High yellow brass	12.87½
Copper, hot rolled	13.25

Anodes

Copper untrimmed	13.75

Wire

Yellow brass (high)	14.87½

OLD METALS

Dealers' buying prices, cents lb.

No. 1 Composition Red Brass

New York	5.75- 6.00
Cleveland	5.75- 6.00
Chicago	5.62½-5.87½
St. Louis	5.75- 6.00

Heavy Copper and Wire

New York, No. 1	6.75- 7.00
Chicago, No. 1	6.87½-7.12½
Cleveland	6.50- 6.75
St. Louis, No. 1	7.00- 7.25

Composition Brass Borings

New York	5.50- 5.75

Light Copper

New York	5.75- 6.00
Chicago	5.12½-5.37½
Cleveland	5.50- 5.75
St. Louis	5.75- 6.00

Light Brass

Chicago	3.12½-3.37½
Cleveland	3.00- 3.25
St. Louis	3.50- 3.75

Lead

New York	3.50-3.87½
Cleveland	3.25- 3.50
Chicago	3.25- 3.50
St. Louis	3.60- 3.75

Zinc

New York	2.50- 2.75
Cleveland	2.50- 2.75
St. Louis	2.75- 3.00

Aluminum

Borings, Cleveland	8.50- 9.00
Mixed, cast, Cleve.	13.25-13.50
Mixed, cast, St. L.	13.00-13.50
Clips, soft, Cleve.	14.75-15.00

SECONDARY METALS

Brass ingot, 85-5-5-5	9.00
*Stand. No. 12 alum.	16.75-17.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.50
Boston, dock, expt.	9.50- 9.75
Boston, domestic	7.50- 7.75
Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	10.50-11.00
Chicago, No. 1	12.25-12.75
Cleveland, No. 1	12.00-12.50
Cleveland, No. 2	11.00-11.50
Detroit, No. 1	9.50-10.00
Detroit, No. 2	8.50- 9.00
Eastern Pa., No. 1	12.00
Eastern Pa., No. 2	11.00-11.25
Federal, Ill.	9.25- 9.75
Granite City, R. R.	9.50-10.00
Granite City, No. 2	8.00- 8.50
N. Y., deal. No. 2	7.50- 7.75
N. Y., deal. barge	8.50- 8.75
Pitts., No. 1 (R. R.)	14.50-15.00
Pitts., No. 1 (dlr.)	13.50-14.00
Pittsburgh, No. 2	12.25-12.75
St. Louis	8.00- 8.50
Valleys, No. 1	13.00-14.00

COMPRESSED SHEETS

Buffalo, dealers	10.50-11.00
Chicago, factory	11.50-12.00
Chicago, dealer	10.25-10.75
Cleveland	11.50-12.00
Detroit	10.25-10.75
E. Pa., new mat.	11.50-12.00
Pittsburgh	13.50-14.00
St. Louis	6.25- 6.75
Valleys	12.50-13.00

BUNDLED SHEETS

Buffalo	8.00- 8.50
Cincinnati, del.	7.50- 8.00
Cleveland	9.50-10.00
Pittsburgh	12.00-12.50
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati	7.00- 7.50
Detroit	5.00- 5.50
St. Louis	4.75- 5.25

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	14.50-15.00
Chicago (3 ft.)	14.00-14.50
Chicago (2 ft.)	15.00-15.50
Cincinnati, del.	13.50-14.00
Detroit	12.50-13.00
Pitts., open-hearth, 3 ft. and less	16.50-17.00
St. Louis, 2 ft. & less	13.25-13.75

STEEL RAILS, SCRAP

Boston	7.50- 7.75
Chicago	12.25-12.75
Pittsburgh	14.75-15.25
St. Louis	11.25-11.75
Buffalo	11.75-12.25

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	3.50- 3.75
Buffalo	10.50-11.00
Chicago	8.00- 8.50
Cincinnati, dealers	7.00- 7.50
Detroit, net	7.00- 7.50
Eastern Pa.	9.50
N. Y., deal. fdry.	6.00
St. Louis	8.00- 8.50

COUPLERS, SPRINGS

Buffalo	14.00-14.50
Chicago, springs	13.50-14.00
Eastern Pa.	14.50-15.00
Pittsburgh	16.50-17.00
St. Louis	12.00-12.50

ANGLE BARS—STEEL

Chicago	14.00-14.50
St. Louis	12.00-12.50

RAILROAD SPECIALTIES

Chicago	13.50-14.00

LOW PHOSPHORUS

Buffalo, billet and bloom crops	14.00-14.50
Cleveland, billet, bloom crops	15.00-15.50
Eastern Pa., crops	15.50-16.00
Pittsburgh, billet, bloom crops	16.75-17.25
Pittsburgh, sheet bar crops	16.00-16.50

FROGS, SWITCHES

Chicago	12.25-12.75
St. Louis, cut	11.25-11.75

SHOVELING STEEL

Chicago	12.25-12.75
Federal, Ill.	9.25- 9.50
Granite City, Ill.	8.00- 8.50

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	10.50-11.00
Buffalo, No. 2	12.00-12.50
Chicago, No. 1, net	9.50-10.00
Chicago, No. 2	12.25-12.75
Cincinnati, No. 2	9.50-10.00
Eastern Pa.	12.00-12.50
N. Y., No. 1, deal.	9.50-10.00
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	9.50-10.00

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	10.00
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	10.50-11.00
Chicago, No. 1	11.00-11.50
Cinci., No. 1, deal.	7.50- 8.00
Cincinnati, No. 2	4.00- 4.50
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	9.00- 9.50
Valleys, new, No. 1	12.25-12.75

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	3.25- 3.50
Buffalo	5.75- 6.25
Chicago	6.50- 7.00
Cincinnati, dealers	5.50- 6.00
Cleveland	7.75- 8.25
Detroit	5.50- 6.00
Eastern Pa.	7.50- 8.00
New York, dealers	3.75- 4.00
Pittsburgh	9.75-10.25
St. Louis	2.25- 2.75
Valleys	8.50- 9.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.50- 2.75
Buffalo	7.00- 7.50
Cincinnati, dealers	5.00- 5.50
Cleveland	8.00- 8.50
Detroit	6.50- 7.00
Eastern Pa.	6.00- 6.25
New York, dealers	1.50- 1.75
Pittsburgh	7.50- 8.50

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	7.25- 7.75
Chicago	6.00- 6.50
Cincinnati, dealers	5.00- 5.50
Cleveland	8.00- 8.50
Detroit	6.00- 6.50
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
St. Louis	2.75- 3.25

PIPE AND FLUES

Cincinnati, dealers	6.50- 7.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.50- 8.00
Cincinnati	5.50- 6.00
Eastern Pa.	9.00- 9.50
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	5.75- 6.00
Buffalo	10.50-11.00
Cleveland	10.00-10.50
Detroit	8.50- 9.00
Pittsburgh	12.00-12.50

FORGE SCRAP

Boston, dealers	4.50
Chicago, heavy	13.50-14.00
Eastern Pa.	11.50-12.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	10.50-11.00
Chicago, elec. fur.	12.00-12.50
Eastern Pa.	11.00
St. Louis	7.75- 8.25

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point	10.50-11.00
Buffalo	13.75-14.25
Chicago, net	14.75-15.25
Eastern Pa.	17.00
St. Louis	12.50-13.00

SHAFTING

Boston, ship point	13.00-13.25
Eastern Pa.	18.50
New York, dealers	13.25-13.50
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal.	6.00- 6.25
Buffalo, iron	11.00-11.50
Buffalo, steel	14.00-14.50
Chicago, iron	12.50-13.00
Chicago, rolled steel	13.50-14.00
Cincinnati, iron	10.00-10.50
Eastern Pa., iron	12.50-13.00
Eastern Pa., steel	14.50-15.00
Pittsburgh, iron	14.25-14.75
Pittsburgh, steel	16.50-17.00
St. Louis, iron	10.00-10.50
St. Louis, steel	12.00-12.50

NO. 1 CAST SCRAP

Birmingham	9.00- 9.50
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	8.00- 8.25
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	12.00-12.50
Buffalo, mach.	12.75-13.25
Chicago, agri. net	9.50-10.00
Chicago, auto	10.50-11.00
Chicago, mach. net	11.50-12.00
Chicago, railr'd net	10.00-11.00
Cinci., mach. cup	10.00-10.50
Cleveland, cupola	12.25-12.75
Detroit, net	10.00-10.50
Eastern Pa., cupola	12.00
E. Pa., mixed yard	10.50
Pittsburgh, cupola	14.00-14.50
San Francisco, del.	13.50-14.00
Seattle	7.50- 9.00
St. Louis, No. 1	9.50-10.00
St. L., No. 1 mach.	11.75-12.25

HEAVY CAST

Boston, del.	6.00- 6.25
Buffalo, break.	10.50-11.00
Cleveland, break	10.00
Detroit, No. 1, mach. net	12.00-12.50
Detroit, break.	8.50- 9.00
Detroit, auto net	11.50-12.00
Eastern Pa.	11.00-11.50
N. Y., break. deal.	6.75- 7.25
Pittsburgh	13.00-13.50

MALLEABLE

Birmingham, R. R.	10.50-11.00
Boston, consum.	12.00-12.50
Buffalo	13.75-14.25
Chicago, R. R.	14.50-15.00
Cincinnati, agri. del.	11.00-11.50
Cleveland, rail	15.50-16.00
Detroit, auto net	12.50-13.00
St. Louis, R. R.	12.50-13.00
Eastern Pa., R. R.	12.00-12.50

RAILS FOR ROLLING

5 feet and over

Birmingham	11.50-12.00
Boston, dealers	8.00- 8.50
Buffalo	12.00-12.50
Chicago	13.75-14.25
Eastern Pa.	13.00-14.00
New York, dealer	10.50-11.00
St. Louis	12.25-12.75

LOCOMOTIVE TIRES

Chicago (cut)	13.50-14.00
St. Louis, No. 1	11.75-12.25

LOW PHOS. PUNCHINGS

Buffalo	14.00-14.50
Chicago	14.50-15.00
Eastern Pa.	15.00-16.00
Pittsburgh (heavy)	16.00-16.50
Pittsburgh (light)	15.00-15.50

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	10.00
No. Afr. low phos.	10.00-10.50
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish No. Africa basic, 50 to 60%	9.50
Tungsten, spot sh. ton unit, duty pd.	$15.50-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.00

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.95c
Boston††	3.00c
Buffalo	3.00c
Chattanooga	3.31c
Chicago (j)	3.00c
Cincinnati	3.17c
Cleveland	3.00c
Detroit	3.09c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.06c
New Orleans	3.30c
New York‡(d)	3.26c
Pitts. (h)	2.95c-3.10c
Philadelphia*	3.03c
Portland	3.70c
San Francisco	3.45c
Seattle	3.70c
St. Louis	3.20c
St. Paul	3.20c
Tulsa	3.25c
IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.17c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.20c
Tulsa	3.25c
REINFORCING BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c
SHAPES	
Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.98c
Pittsburgh(h)	3.15c
Portland (i)	3.70c
San Francisco	3.45c
Seattle (i)	3.70c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c
PLATES	
Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, ⅜-in.	3.65 c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c
NO. 10 BLUE	
Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.70c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.30c
Tulsa	3.70c
NO. 24 BLACK	
Baltimore*†	3.60c
Boston (g)	3.95c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.07c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New Orleans	4.50c
New York	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.90c
Tulsa	4.75c
NO. 24 GALV. SHEETS	
Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.30c
Pitts** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.50c
Tulsa	5.10c
BANDS	
Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York(d)	3.56c
Philadelphia	3.18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.25c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.45c
HOOPS	
Baltimore	2.30c
Boston	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York	3.56c
Philadelphia	3.43c
Pittsburgh(h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.55c
COLD FIN. STEEL	
Baltimore (c)	3.58c
Boston	3.75c-3.90c
Buffalo (h)	3.40c
Chattanooga*	3.98c
Chicago (h)	3.35c
Cincinnati	3.57c
Cleveland (h)	3.35c
Detroit	3.49c
Los Ang.(f) (d)	5.85c
Milwaukee	3.46c
New Orleans	4.15c
New York	3.81c-4.31c
Philadelphia	3.61c
Pittsburgh	3.20c
Portland (f) (d)	6.00c
San Fran.(f) (d)	5.95c
Seattle (f) (d)	6.00c
St. Louis	3.60c
St. Paul	3.87c
Tulsa	4.50c
COLD ROLLED STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.44c
Cleveland (b)	3.20c
Detroit	3.33c
New York	3.36c
St. Louis	3.45c
TOOL STEELS	
(Applying on or east of Mississippi river; west of Mississippi 1c up)	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c
Uniform extras apply	
BOLTS AND NUTS	
(100 pounds or over)	Discount
Chicago (a)	70
Cleveland	70
Detroit	70–5
Milwaukee	70
Pittsburgh	70-10-5

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 inches; (j) shapes other than rounds, flats, fillet angles, 3.15c.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Oct. 3

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15 31 3 2 6	$13.99	1 15 0
Basic bessemer	15 31 3 2 6*	12.91	1 12 0
Hematite, Phos. .03-.05	15.93 3 5 0	.....	.....
SEMIFINISHED STEEL			
Billets	$26.95 5 10 0	$18.98	2 7 0
Wire rods, No. 5 gage	41.65 8 10 0	36.38	4 10 0
FINISHED STEEL			
Standard rails	$40 43 8 5 0	$36.34	5 10 0
Merchant bars	1.64c 7 10 0	1.14c to 1.19c	3 2 6 to 3 5 0
Structural shapes	1.62c 7 7 6	1.12c	3 1 6
Plates, †¼ in. or 5 mm.	1.75c 8 0 0	1.54c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2.03c 9 5 0	2.12c	5 16 0††
Sheets, gal., 24 gage, corr.	1.37c 6 5 0	3.19c	8 15 0
Bands and strips	1.86c 8 10 0	1.45c	4 0 0
Plain wire, base	2.03c 9 5 0	1.85c	5 7 6
Galvanized wire, base	2.35c 10 15 0	2.28c to 2.32c	6 5 6 to 6 7 6
Wire nails, base	2.63c 12 0 0	2.10c	5 15 0
Tin plate, box 108 lbs.	$ 4.41 0 18 0	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.54	3 7 6(a)	$17.13	260	$12.51	370	$25.34 63
Basic bessemer pig iron	17.15	3 10 0	12.52	190	11.15	330	27.96 (b) 69.50
Furnace coke	4.04	0 16 6	6.26	95	3.89	115	7.64 19
Billets	26.95	5 10 0	28.34	430	18.25	540	38.82 96.50
Standard rails	1.81c	8 5 0	2.08c	694	1.65c	1,100	2.42c 132
Merchant bars	1.88c	8 12 0	1.68c	560	.90c	600	2.01c 110
Structural shapes	1.92c	8 15 0	1.65c	550	.90c	600	1.97c 107.50
Plates, †¼-in. or 5 mm.	1.98c	9 1 3	2.10c	700	1.05c	700	2.32c 127
Sheets, black	2.41c	11 0 0§	1.86c	620‡	1.24c	825‡	2.64c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.85c	13 0 0	3.45c	1,150	2.25c	1,500	6.77c 370
Plain wire	2.03c	9 5 0	3.15c	1,050	1.73c	1,150	3.17c 173
Bands and strips	2.05c	9 7 0	1.95c	650	1.26c	840	2.32c 127

*Basic. †British ship-plates. Continental, bridge plates. $24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 64.70 per cent over paper sterling.

Bars

Bar Prices, Page 66

Cleveland—Despite the advance of $1 a ton in the base price of soft steel bars, which became effective Oct. 1, large consumers still will be able to buy bars at a lower price than formerly, due to the system of quantity deductions which was announced early in August, and which continues in force. Producers' first action was to establish quantity extras for lots up to 25 tons, and quantity deductions for 25 tons and more. Then, because of numerous complaints from small users, they revised the list to make quantity extras apply only on lots up to 5 tons. As matters now stand, buyers of 5 to 25 tons will pay the new base price, 1.85c, Pittsburgh. On lots from 25 to 50 tons, the quantity deduction will bring the price to 1.80c; on 50 to 100 tons, the deduction will make the price 1.77½c; and on 100 tons or more, to 1.75c. The increase in the base drove in comparatively little tonnage, but actual demand has held up well, and some improvement was noted in releases from automobile interests.

Pittsburgh—A heavy volume of carbon steel bar orders was placed by a wide range of buyers just before the Oct. 1 deadline when revised quantity extras went into effect. Producers permitted buyers to order under the old 1.80c, Pittsburgh base, regardless of quantity above 12,000 pounds, for shipment through October. However, on business taken since that time, the new system of quantity extras applies, finding 5 to 25-ton lots base at 1.85c, Pittsburgh. Reflecting heavier buying from the automotive industry, alloy bars are moving at a more rapid pace, the market on which continues 2.45c, Pittsburgh.

Chicago—Bar sales and specifications are close to the average of recent weeks, with automotive demand tending upward. Improvement in the latter is slow, due to delays in starting assemblies of new models, but heavier shipments are looked for within a few weeks. Miscellaneous consumers show no slackening in bar needs, and the recent active pace of farm implement operations continues. Buyers still show a tendency to order for only a short distance ahead rather than to contract through the quarter.

Boston — Buying has slackened, following some advance purchasing and covering for fourth quarter. Releases against the latter have not materialized in volume. Alloy and forging bars continue active. On new business 1.85c, Pittsburgh, is being done on commercial steel bars, but many consumers covered for this quarter at third quarter quotations.

New York—Makers of bolts and nuts have been substantial buyers of steel bars recently, although since the first of the month the general volume has dropped somewhat, due to previous protective buying.

Philadelphia — Commercial steel bar tonnage so far this month has been rather light, reflecting anticipatory buying prior to Oct. 1, at which time the new quantity extras and deductions went into effect. However, releases reflect expanding consumption and some bar makers who have large customers, particularly in the automotive field, report an increase in new contracting, as these consumers found it advantageous to hold off until after the end of last month. Most of these customers, however, are outside the district. The new base price is 1.85c, Pittsburgh, or 2.16c, Philadelphia.

Ferro Enamel Corp., Cleveland, has booked an order for a porcelain enameling furnace from Porcelain Metals Inc., Brooklyn, N. Y.

NITTANY

Free Turning

BRASS RODS

Twenty years of brass specialization is "thrown in" with every free turning brass rod that you buy from Titan.

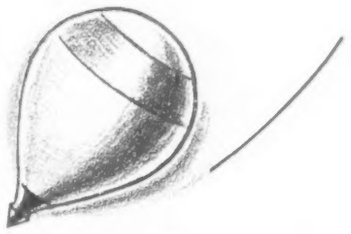
This added margin of quality assures manufacturers of brass screw machine products, a Free Turning Brass Rod that is second to none.

Titan believes that a brass rod, to be of good machinable quality, should be low in iron and tin contents, and have uniform lead distribution and hardness.

Titan therefore guarantees that all Nittany Free Turning Brass Rod will pass A.S.T.M. and S.A.E. specifications, and that it is free from physical defects, particularly the extrusion defect, commonly called "pipe" or "core".

Our chemical, metallurgical and engineering staff may be helpful to you—especially if you have some peculiar condition to meet and need some special composition or some different temper rod.

Inquire—you will not be obligated.



Titan Metal Manufacturing Company

Brass and Bronze Products

Bellefonte, Pennsylvania

Plates

Plate Prices, Page 66

Pittsburgh — Approximately 400 tons of steel plates will be required for four 100 x 26 x 6½-foot steel dump scows to be bought by the Pittsburgh army engineers Oct. 12. Request for bids asks that delivery be completed within 210 days. Gulf Refining Co., Pittsburgh, has taken bids on 12 vertical tanks to be built at Erie, Pa., which will require about 300 tons of plates. A growing plate market is forecast in the placing of vertical tanks on ordinary river coal barges, as compared with the so-called "skin tight" design of river oil barge. American Barge Lines recently placed 18 of such tanks on six of its barges. In addition to a tonnage of carbon steel plates, approximately 500 tons of wrought iron plates will be required for construction of the federal dredge JEWETT, bids on which will be opened at Louisville, Ky., Oct. 18, by United States engineers. Plates are quoted 1.80c, base, Pittsburgh.

Cleveland—The market situation has improved from the standpoint of small orders, with most coming from manufacturers of machinery and industrial equipment. In the experience of some sellers here most tonnage now is from these sources. Tank and boiler business is less promising, although the Pittsburgh Steamship Co. has awarded contract to the American Shipbuilding Co. for reboilering three lake vessels, and some additional work of this type is expected later in the season. The increase of $1 a ton in the base price of bars has had some strengthening influence in plates, which generally synchronize with bars, although no actual change in price is contemplated.

Chicago—Occasional gains are noted in demand for fabricated plates for private projects though public construction work still accounts for most tonnage. Railroad repair shops are taking only small lots. Oil refineries have been more active lately in building and improvements, particularly in Michigan. Several proposed oil and gas lines remain in the formative stage.

Boston — A steady volume of small orders maintains plate volume at the recent rate. First plates for the two submarines to be built at the Portsmouth, N. H., navy yard will be placed Oct. 15. Chicago Bridge & Iron Works, Chicago, will fabricate tanks for the American Oil Co., Chelsea, Mass., taking close to 2000 tons. Prices are steady at 2.22c, Boston.

New York—With the Newport News Ship Building & Dry Dock Co., Newport News, Va., the only bidder on a 10,000-ton navy cruiser, requiring 6500 tons of steel, it is considered likely the bid will be rejected. Bids on repairs to the Morgan liner DIXIE will be submitted by yards shortly. This work is expected to take at least 200 tons of plates. Miscellaneous plate tonnages are giving only fair support to the market.

Philadelphia—While little plate tonnage is outstanding the new month is slightly more active. Ship releases continue to help operations of some mills and further shipwork, particularly for the navy, is scheduled to come up for figuring about the middle of this month.

Seattle — Following the special election legalizing a $175,000 bond issue, Everett, Wash., opened bids Oct. 4 for a water line extension to serve the Weyerhaeuser pulp mill, requiring 800 tons of plates. Puget Sound Machinery Depot, Seattle, will soon begin construction of an extension for the same city, fabricating 300 tons at the local plant.

Contracts Placed

1700 tons, 20 and 24-inch welded steel pipe, East bay municipal utility dis-

ANOTHER SPECIAL SHELL By HACKNEY

Countless shells, shapes, tanks, bottles, etc., are made to special requirements by Hackney.

They are cold drawn, assuring a smooth finish, uniform temper and thickness. Laminations in the finished product are prevented.

At right is illustrated a carbonator drum, made from a seamless shell with integral head, to which separate bottom is fitted after lining has been applied.

It is just one of many manufactured by Hackney for important companies.

The Hackney service, backed by over 30 years of experience, is offered for your use. Send your blue prints or specifications for Hackney engineers to study, and possibly to recommend more efficient meeting of your shape requirements.

PRESSED STEEL TANK COMPANY

208 S. La Salle St. Bldg., Room 1121, Chicago
6661 Greenfield Ave., Milwaukee, Wis.
1387 Vanderbilt Concourse Bldg., New York
688 Roosevelt Bldg., Los Angeles, Calif

Hackney
MILWAUKEE

DEEP DRAWN SHELLS AND SHAPES

trict, Oakland, Calif., to Steel Tank & Pipe Co., Berkeley, Calif.

450 tons, one 118,000-barrel tank, Texas Empire Pipe Line Co., Heyworth, Ill., to Chicago Bridge & Iron Works, Chicago.

Contracts Pending

10,600 tons, pipe line for metropolitan water district, Los Angeles, specification 115; bids Oct. 24.

900 tons, siphons for water works improvement, Denver; bids Oct. 7.

800 tons, 56-inch water line extension, Everett, Wash.; bids in.

500 tons, for 2,000,000-gallon standpipe at Dunkirk, N. Y.; McClintic-Marshall Corp., Bethlehem, Pa., low bidder; bids Oct. 1.

400 tons, four steel dump scows, for Pittsburgh army engineers; bids Oct. 12.

300 tons, 12 tanks, Erie, Pa., for Gulf Refining Co., Pittsburgh; bids received.

200 tons, 500,000-gallon elevated water tank, State College, Pa.; details on design not yet settled, award expected week of Oct. 7. Morris Knowles & Co., Westinghouse building, Pittsburgh, engineer.

120 tons, 16-inch welded steel pipe, Arcadia, Calif.; bids opened.

Transportation

Track Material Prices, Page 67

Chesapeake & Ohio has closed on its inquiry for steel rails, dividing 21,842 tons of 131-pound rail, as well as some fastenings. The tonnage was divided among four makers, as follows: Inland Steel Co., Chicago, 7426 tons; Illinois Steel Co., Chicago, 9414 tons; Carnegie Steel Co., Pittsburgh, 2818 tons, Bethlehem Steel Co., Bethlehem, Pa., 2184 tons.

Domestic freight cars bought in September numbered 875, bringing the total for nine months to 7908, compared with 23,390 in the same period last year. Other comparisons:

	1935	1934	1933	1932
Jan.	24	152	3	159
Feb.	806	19,725	0	35
March	0	30	5	105
April	350	800	50	0
May	2	717	8	60
June	5,151	1,835	500	0
July	500	19	306	25
Aug.	200	105	202	5
Sept.	875	7	23	1,298
9 Mo.	7,908	23,390	1,097	1,747
Oct.		75	514	0
Nov.		254	533	2
Dec.		110	316	50
Total		23,829	2,460	1,739

Except for wheels the New York Central has not placed its miscellaneous fourth quarter requirements, on which bids were opened Sept. 26.

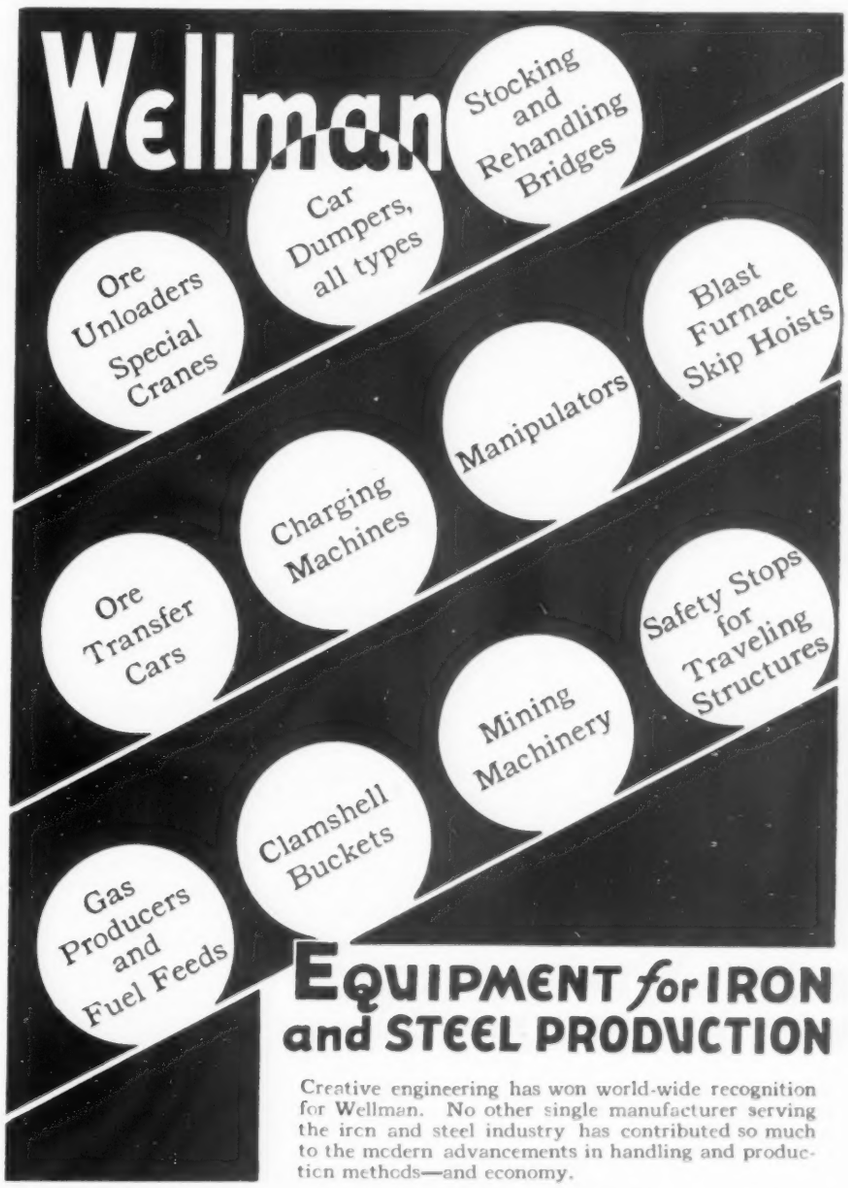
Canadian National has awarded five locomotives to the Canadian subsidiary of the American Locomotive Co. at Montreal, Que.

Union Railroad Co., Pittsburgh, a subsidiary of United States Steel Corp., is rehabilitating 150 all-steel coal cars at its Monongahela, Pa., shops. The cars, each of which weighs 54,200 pounds, are being reduced in weight by about 6 tons, to 42,000 pounds net, through the use of high tensile steel in the car bodies.

J. G. Brill Co., Philadelphia, is assembling 26 cars for the Delaware river bridge commission. Pullman Standard Car Mfg. Co. will produce 20 trolley coaches for the Cleveland Railway Co. at its Pullman, Ill., shops, and 15 trolley buses for Dayton, O. An order for four mail baggage rail cars for the Seaboard Air Line was recently divided between St. Louis Car Co. and the American Car & Foundry Co. One hundred out of 1500 Chesapeake & Ohio steel hopper cars which have been awarded will be equipped with "Cor-Ten" doors for experimental purposes.

Pressed Steel Car Co., Pittsburgh, has received an additional order from the Southern railway for 300 cars for its subsidiary, Cincinnati, New Orleans & Texas Pacific. Originally the order had been for 200 cars.

Between 6000 and 7000 tons of plain material will be required by



EQUIPMENT for IRON and STEEL PRODUCTION

Creative engineering has won world-wide recognition for Wellman. No other single manufacturer serving the iron and steel industry has contributed so much to the modern advancements in handling and production methods—and economy.

Also—WELDED STEEL CONSTRUCTION; MACHINE WORK to your drawings.

THE WELLMAN ENGINEERING CO.
ENGINEERS CONSTRUCTORS MANUFACTURERS
CLEVELAND, OHIO
BIRMINGHAM · NEW YORK · MEXICO CITY

the Norfolk & Western for the construction of the 500 hopper cars it proposes to build in its own shops in Roanoke, Va.

Car Orders Placed

Cincinnati, New Orleans & Texas Pacific, subsidiary of the Southern Railway, 200 automobile cars, to Pressed Steel Car Co., Pittsburgh; these are in addition to 300 of similar type placed earlier.

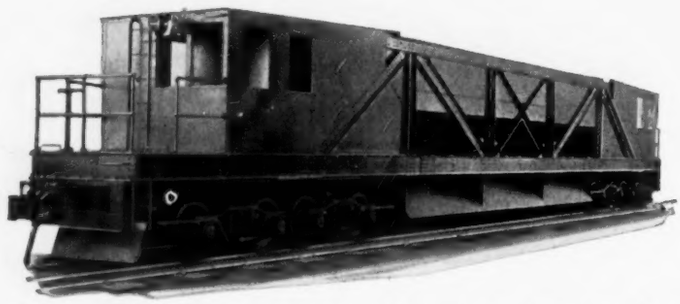
Rail Orders Placed

Chesapeake & Ohio, 21,842 tons, divided as follows: 7426 tons to Inland Steel Co., Chicago; 9414 tons to Illinois Steel Co., Chicago; 2818 tons to Carnegie Steel Co., Pittsburgh; 2184 tons to Bethlehem Steel Co., Bethlehem, Pa.

Buses Booked

American Car & Foundry Motors Co., New York: Twenty 35-passenger for Capital Transit Co., Washington; twelve 30-passenger for The Connecticut Co., New Haven, Conn.; eight 30-passenger for Memphis Street Railway Co., Memphis, Tenn.; five 31-passenger for New Orleans Public Service Inc., New Orleans; two 28-passenger for Blue Way Lines Inc., Springfield, Mass.

ATLAS ORE TRANSFERS



100 ton—3 compartment Ore Transfer. Roller Bearing Journals. Double end control for car operation. Individually operated discharge gates.

OTHER ATLAS PRODUCTS

Gas-Electric and Diesel-Electric Locomotives . . . Electric Transfer Cars for Blast Furnaces and Steel Plants . . . Stockhouse Scale Cars for Blast Furnaces . . . Concentrate and Calcine Cars for Copper Refineries . . . Automatic and Remote Controlled Electric Cars . . . Pushers, Levellers and Door Extractors . . . Coal Charging Lorries, Coke Guides and Clay Carriers . . . Atlas Patented Coke Quenching Cars for By-Product Coke Ovens . . . Atlas Patented Indicating and Recording Scales . . . Special Cars and Electrically Operated Cars for every conceivable Purpose

THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

Sheets

Sheet Prices, Page 66

Pittsburgh—Galvanized sheet mill operations hold at 70 to 75 per cent, while common black and full-finished mill operations are 65 to 70 per cent. Operations of jobbing mills last week were 45 per cent. Base prices are firm. Important automotive tonnage is in prospect.

Cleveland—A strong rebound in demand for sheets has set in from automobile manufacturers and partsmakers, and some mills last week accumulated backlogs for two to three weeks' rolling. The Cleveland mill was operating close to capacity. Tonnage for the week was larger than the average for September in the experience of most sellers. At the same time, barrelmakers and refrigerator manufacturers also increased their releases, and the outlook for the next two months was appraised as highly promising. Prices are firm.

Chicago—Sheet production and orders continues active despite somewhat smaller automotive releases. While automotive demand is moderately heavy, some companies are slow to increase assemblies. Ford, it is understood, will be delayed two weeks in starting work on new models. Sheet business elsewhere is steady and well distributed. Prices are firm, but consumers still refrain from buying far ahead.

Boston — Sheet buying is well maintained, with some decline in demand for galvanized by jobbers who bought moderately before the turn of the quarter. Industrial and small tank consumers take steady shipments, notably the latter, although oil burner tank builders have in most instances attained or passed the seasonal peak. Special finished material is fairly active in small lots.

New York—Sheet business is fairly good, although less active than a week ago when jobbers made a belated rush to get galvanized sheets from producers' stocks before the elimination of jobbers' differentials went into effect. Except in this line, producers are looking forward to better business this month. Prices are unchanged.

Philadelphia—Demand is diversified and good specifications are coming from stovemakers and radio manufacturers. Producers of prime material, however, complain of an increasing amount of seconds and rejects offered in some quarters and which apparently are finding ready sale. This off-grade material includes certain grades of hot and cold-finished sheets.

Cincinnati — Specifications for sheets for automobile manufacturers are expanding, placing demand of

district mills near 80 per cent. All light gage, rolled materials are active. Buying for miscellaneous users is steady.

Buffalo—Buffalo sheet mills are operating at 80 per cent. Heavy bookings assure high production for this quarter.

St. Louis—Demand for sheets is steady, galvanizing for roofing and general purposes still leading activity. Purchasing by warehouses is limited mainly to necessities, inventories having been built up during the past two months.

Birmingham, Ala.—Sheet mills are producing actively and shipments are steady. Considerable tonnage is going to agricultural sections.

Seattle — A good demand is noted for sheets, light gage, galvanized and black, leading, for fall repair work including furnaces, roofs, service stations and general. Alaska is buying rather freely, although that market will end shortly for the winter.

Pipe

Pipe Prices, Page 67

Pittsburgh — Small-lot specifications for tubular goods are sufficient to maintain pipe mill operations at about 40-45 per cent of capacity. At least three promising pipe line projects are still being discussed in the trade, but with the approach of winter, it seems likely that laying of these lines may be delayed until 1936. Automotive specifications for tubing are perking up and there is a better volume of oil country goods. All discounts on tubular products are firm and without change.

Discounts now being used are those which were put in effect by mills on or about April 27, 1934, which show a base discount for 1-inch to 3-inch black pipe of 6 per cent.

Cleveland — While miscellaneous requirements for steel pipe are fairly active, in cast pipe the market is slow, little municipal work being figured. Shipments of 500 tons of cast pipe for the first section of Cleveland's easterly sludge line have started; bids have been taken on 500 to 600 tons for the second section, but no award made, and bids will be taken on 600 to 700 tons for the third section Oct. 11.

Chicago — Cast pipe continues quiet, with no appreciable change in volume of orders, inquiries or shipments. Among proposed line pipe installations is a 140-mile projects from Toledo, O., to Montcalm county, Michigan.

Boston — Cast pipe buying is light and in small lots. For Lowell, Mass., a contractor has placed 250 tons. Merchant steel pipe demand is steady and well distributed for repairs with slightly more miscellaneous construction needs.

New York—Cast pipe inquiry is slightly improved, partly due to heavier purchasing for public work projects, procurement division, treasury department, New York, having bids on close to 1000 tons. Large individual requirements are lacking with buying confined to fill-in lots, including more sewer work. Cast pipe prices are steady and less fluctuating.

Birmingham, Ala.—Buying of cast iron pipe is mostly in small lots although larger projects are in prospect at several points. Shipments are steady.

San Francisco—Demand for cast iron pipe is practically at a standstill and the outlook is far from encouraging. So far this year only 27,370 tons have been booked as compared with 30,970 tons for the corresponding period in 1934.

Seattle — Many municipalities in the Pacific Northwest plan improvements and extensions to water systems but cannot move until their applications for federal aid are approved. The requirements are large

"A.W." *Super-Diamond for* THE U.S. NAVY

Uncle Sam's "watch dogs" are now using the new "AW" Super-Diamond Pattern! A typical choice—emphasizing the desire to provide the Navy with every safeguard. For "AW" floor plates *are* safe—and permanent.

Be sure your floor plates are really safe—specify "AW" plates. Also available in the reliable standard *Diamond* and *Diamondette* patterns—ferrous and non-ferrous metals.

ALAN WOOD STEEL CO. ESTABLISHED 1826 TRADE "A.W." MARK CONSHOHOCKEN, PA.

SLIP-PROOF • OIL-PROOF
HEAT-PROOF • CRACK-PROOF
SAFE • SIGHTLY • SELF-DRAINING • SPLINTERLESS

109 Years' Iron and Steel Making Experience

ALAN WOOD STEEL CO.

CONSHOHOCKEN, PENNSYLVANIA

Branch Offices: PHILADELPHIA • NEW YORK • SEATTLE
LOS ANGELES • SAN FRANCISCO • MEMPHIS • BOSTON

and there should be a strong demand for cast iron pipe as quickly as funds are available. Willamina, Oreg., will take bids Oct. 10 for water system improvements including 25,000 feet of 4 and 5-inch pipe and accessories.

Steel Pipe Placed

165 tons, discharge pipe and fittings, United States engineer, Kansas City, Mo., to Maynard Electric Steel Casting Co., Milwaukee.

Unstated tonnage, 140-mile pipe line from Montcalm county, Mich., to Toledo, O., for Simrall Pipe Line Co.

Strip Steel

Strip Prices, Page 67

Pittsburgh — Automobile strip steel buying is beginning to increase. On present transactions there appears to be no deviation from firm base prices of 1.85c, Pittsburgh, for hot-rolled strip steel and 2.60c, base, Pittsburgh or Cleveland, for cold-rolled strip steel. Since the slight change in the commodity classification on cold-rolled strip steel, which went into effect around Aug. 1 and was designed to meet cold-rolled sheet competition where drawing extras had been waived, there has been no change in strip pricing. Producers' operations on both hot and cold-rolled strip steel are tending higher and are averaging around 45 per cent.

Cleveland—Strip releases, like those for sheets, increased substantially during the week, especially from automobile partsmakers. September bookings for mill interests here were nearly equal to those of August, and October tonnage is expected to exceed that of September or August.

Chicago — Automotive strip demand is improving more slowly than had been anticipated, but this is believed to be only temporary. Business in other directions is holding well, principally moderate lots for early consumption.

Boston — Cold-rolled strip volume again tends upward, although slightly, with stamping and miscellaneous requirements well maintained. Mill operations are a few points higher. Hot strip specifications are steady. While cold strip prices on the general run of business are steady at 2.80c, Worcester, Mass., there is an increasing tendency on the part of some cold rollers to extend commodity basis sales operative under the former code designed to meet competition with slit cold sheets. On such business cold strip has moved in the East $6 to $8 a ton under listed quotations. Although not a new situation, the practice is apparently spreading, among rerollers especially.

New York—Strip buying continues fairly brisk, with automotive accessory requirements expected to increase sharply this month.

Philadelphia — While restricted in character, strip buying continues to show some expansion, with stovemakers and radio manufacturers placing fair business. The trend of business has been upward since early July, it is said. Hot strip is steady at 1.85c, Pittsburgh, or 2.16c, Philadelphia, and cold strip at 2.60c, Pittsburgh, or 2.91c, Philadelphia.

Semifinished

Semifinished Prices, Page 67

Semifinished steel requirements of sheet mills are outstanding in the market, with a decline in tin plate operations and a generally unchanged condition in skelp, tube rounds, and wire rods. However, a measure of improvement apparently is in store for re-rolling billets in view of increased strip mill operations, and for forging quality billets, due to automobile assembly programs. Sheet bars are $28, Pittsburgh; re-rolling billets, $27; wire rods, $38 and skelp, 1.70c.

Behind the Scenes with STEEL

Burmese Butchery

SCANNING the pages of the *Rangoon Gazette* (never mind the atlas; Rangoon is a city in Burma, eastern India, pop. 341,962) we came across an interesting local item which you might like to read, to wit:

> Tirakarapan 45, Ranga 20, Armugan 20, Alagam 25 and Yenkama 20, the latter a woman, all members of the Telugu household in 18th Street, attended hospital late on Saturday night for treatment of superficial injuries they had received during a domestic quarrel. It is stated that they had been cut with a dah.

From superficial observation, it looks to us like Ranga, Armugan and Aiagam, three spry kids, decided they all had a yen for Yenkama, no doubt a raving beauty. But old Tirakarapan, wiser and steadier, stepped in and decided they didn't; whereupon all and sundry whipped out their dahs and started cutting. Lovely people, these Burmese.

• • •

Well-thumbed Pages

OUR Readers' Service Department is doing a little quiet research on the matter of ascertaining exactly how many persons read copies of STEEL in various plants. One metalworking company actually lists 23 readers of one copy each week—all men associated with administrative, purchasing and engineering departments.

A tool manufacturer lists 18 executives who read a single copy each week. A steel castings producer notes 14 men who share one copy. And so on down through a long line of industries.

Out of this study are going to come some startling figures on readership. We'll let you in at the finish.

• • •

Nasty Fish

OUR scout in charge of boon-doggling developments in Washington relays the information that one of the latest grants involves some $7000 for "removing obnoxious fish from streams" in Texas. In other words, if the fish in Texas streams can't behave like gentlemen, a righteous government will see that they are ostracized.

We have a number of pet projects in mind which we have forwarded to boondoggling experts at the capitol. Still awaiting action, they are:

$50,000, for exterminating a vicious form of insect known popularly as "news broadcasters."

$100,000, for a complete study of the origin and evolution of Pullman-car names.

$25,000, for plowing under every third insurance salesman.

We would be glad to receive suggestions for further suitable projects which will be submitted forthwith to No. 1 boon-doggler at Washington.

• • •

Reading for Profit—

ONE of our editors tells us he asked a prominent machine tool builder the other day how he liked STEEL'S *Forum on Modernization*. His reply, according to notes scratched on our editor's cuff, was, in effect, as follows: "I read every installment of your *Forum* closely; as a matter of fact, it has given me an entirely new concept of my sales problems—a good insight into what lines of thought are being pursued by others in our industry. I pass the articles along to our entire executive personnel to read. Incidentally, as a result of reading these *Forum* articles, I now read STEEL carefully from cover to cover and find a lot of value each week. STEEL now is the most carefully read and most widely read publication we receive in our plant."

That brings up the question: What sort of a subscriber are you? A leafer? A skimmer? A reader? The only way to make your investment pay big dividends is to read carefully and thoroughly. Then we know we've got you sold.

• • •

Conversion Charts Handy

THE hardness conversion chart, presented as an insert in the Sept. 23 issue of STEEL has been so popular that a limited number of reprints have been made. They are available at 25 cents for the first copy, and 10 cents each for all additional copies.

• • •

New Puzzles

WE ARE used to all kinds of questions, some of which we answer offhand out of our wealth of knowledge, and others that would take a Philadelphia lawyer to decipher. The most recent in the latter category was as follows: "I will purchase 2500 of 3 drum 50 to 100 and 150 lb. hoisting and skidding engines of diesel or electric motors crawler type traction is to revolve around the a frame made for cast will do or steel exclusively chain propelled by these drum shafts sprockets and will use double chain scraper buckets to excavate clay and road trucks." Perhaps our readers will be better at decoding than we were.

—SHRDLU

Shapes

Structural Shape Prices, Page 66

New York — Structural inquiry is heavier, approximately 20,000 tons being active, the larger projects including 3300 tons for a subway, on which bids are in; 5500 tons for a Triboro, New York, bridge section approach, and 3600 tons, high school, Brooklyn. Small volume inquiry also is broader, with used refabricated and imported material entering into considerable of the latter.

PWA has allocated all of the $200,000,000 apportioned by it under the $4,800,000,000 work relief program, with all states participating except Louisiana. In future, only a direct loan from the PWA revolving fund of $500,000,000 will be available.

Pittsburgh — Between 2050 and 2100 tons of fabricated structural steel have been awarded to McClintic-Marshall Corp., Bethlehem, Pa., for the construction of 11 railroad bridges in connection with relocating the Baltimore & Ohio railroad tracks at the Tygarts valley dam, West Virginia. Guthrie, Marsh & Walker, Chicago, are general contractors on their bid of $2,935,217. Plain structurals hold at 1.80c, base, Pittsburgh.

Cleveland — PWA has allotted $580,000 for eliminating three grade crossings in Cuyahoga county (Cleveland) which will require at least 1000 tons of shapes, according to fabricators' estimates. Date for taking bids on these projects has not been determined, and it is uncertain whether they will be handled by the county commissioners or by the state. Contract No. 88 for additional buildings at Cleveland's easterly sewage disposal plant on which bids will be taken Oct. 17 requires 300 tons of shapes as well as 380 tons of reinforcing bars, and 100 tons of miscellaneous steel items. Ohio Boxboard Co., Rittman, O., has awarded 200 tons for a plant building.

Chicago — New inquiries include about 5500 tons for state bridges, most of which are small. About 1800 tons of piling is pending for an Illinois river lock near Peoria and a dam at Onalaska, Wis. Awards are smaller than the average of recent weeks and are principally for public projects. The largest is 2200 tons for an Illinois bridge.

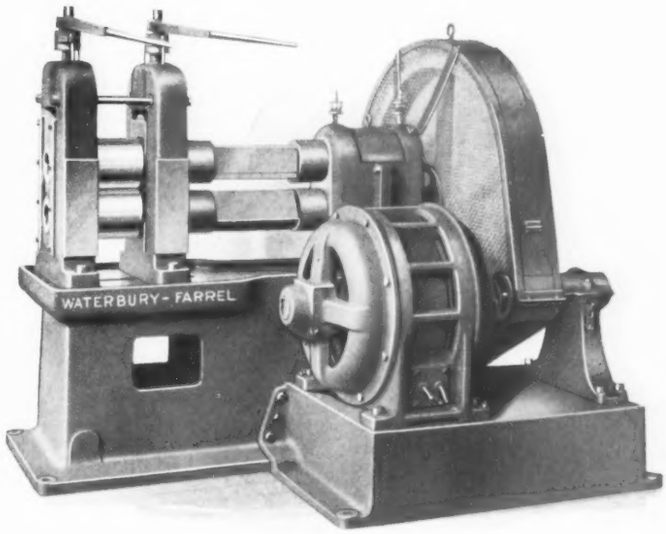
Boston — Structural inquiry is gradually moving upward, with indications of a sharp increase in the next few weeks. PWA work, including several large grade crossing projects, are expected out shortly. Bridges, schools and small postoffices make up the bulk of current active needs. Several of the smaller fabricating shops are slightly more active.

Philadelphia — While fabricators report a fair volume of work from outside the district, local structural activity continues greatly restricted. Possibly the largest recent tonnage involves 350 tons for the Sixty-ninth street terminal here, on which bids will be opened this week. The board of education has approved the construction of 13 new schools, two of which will be up for bidding early in November, but the total amount of structural steel involved has not as yet been estimated. Shapes are

Shape Awards Compared

	Tons
Week ended Oct. 5	20,665
Week ended Sept. 28	28,350
Week ended Sept. 21	18,522
This week, 1934	19,984
Weekly average, 1934	16,284
Weekly average, 1935	15,977
Weekly average, September	16,725
Total to date, 1934	685,625
Total to date, 1935	655,065

Rolling Mills



Used for Finishing or Wire Flattening

Built with—5", 6", 8", and 10" Diam. Rolls

Plain or Anti Friction Bearings

Water Cooling Attachment

A Complete Line of Winders—Coilers—

Edging Rolls etc.

The Waterbury Farrel Foundry and Machine Company

Waterbury, Connecticut

OFFICES

CLEVELAND CHICAGO PHILADELPHIA

unchanged at 1.90c, Bethlehem, Pa., or 2.015c, Philadelphia.

New Jersey Zinc Co. is reported to have placed 600 tons for a plant addition at Palmerton, Pa., with the American Bridge Co., Pittsburgh.

St. Louis—The recent increased rate of operations at structural steel fabricating plants has been maintained, and work is in prospect to continue steadily for the next few weeks. Public works are supplying bulk of current tonnage. The local United States engineer's offices has recommended awarding the contract for lock No. 25, near Cap Au Gris, Mo., to the United Construction Co., Winona, Minn., low bidder. This calls for 1300 tons of structurals, 114,000 square feet of steel piling and 558 tons of reinforcing bars.

Birmingham, Ala. — Structural steel fabricating shops are busy, although smaller tonnages now predominate. Shipments are heavy.

San Francisco—Structural shape lettings were the lowest in over two months, only 774 tons placed. This brings the year's aggregate to 82,928 tons, compared with 102,811 tons for the same period a year ago.

Seattle — Fabricating plants here and at Portland, Oreg., have generally completed their contracts and are eager to book new work. The largest job pending is the Bonneville, Oreg. power house involving about 400 tons, bids at Portland, Oct. 15. Warden-Allen Co., Milwaukee, has been officially awarded the contract to furnish steel gates and drop tubes, totaling 700 tons, for the Bonneville dam, on a bid of $130,280.

Shape Contracts Placed

6950 tons, Homestead bridge, Homestead, Pa., to American Bridge Co., Pittsburgh.

2200 tons, bridge, Meredosia, Ill., to American Bridge Co., Pittsburgh.

2050 tons, Baltimore & Ohio railroad track relocation, Tygarts valley dam, West Virginia, to McClintic-Marshall Corp., Bethlehem, Pa.; Guthrie, Marsh, Walker Co., Chicago, general contractor at $2,935,217.

1210 tons, lock 25, Mississippi river, to Mississippi Valley Structural Steel Co., Decatur, Ill.

910 tons, warehouses, South Jersey port commission, Camden, N. J., to Belmont Iron Works, Philadelphia.

700 tons, gates, drop tubes, etc., Bonneville, Oreg., dam project, to Warden-Allen Co., Milwaukee.

600 tons, plant addition, New Jersey Zinc Co., Palmerton, Pa., to American Bridge Co., Pittsburgh.

580 tons, railroad bridge, Newark, N. J., for Central Railroad of New Jersey, to Phoenix Bridge Co., Phoenixville, Pa.

425 tons, additions, buildings 11 and 12, navy yard, Brooklyn, N. Y., to F. M. Weaver & Co., Lansdale, Pa.

375 tons, state highway bridge, Bridgeton, N. J., to Virginia Bridge & Iron Co., Roanoke, Va.; Merritt, Chapman & McLean Co., Baltimore, general contractor.

350 tons, theater, Bronx, New York, to Egleston Bros. & Co., Long Island City, N. Y.

325 tons, bridge, E. R. P. No. 3, Adams county, Colorado, to Virginia Bridge & Iron Co., Roanoke, Va.

310 tons, coal breaker, Sullivan Trail Coal Co., near West Pittston, Pa., to Weatherley Steel Co., Weatherley, Pa.

300 tons, penstock, North Platte, Nebr., to Allis-Chalmers Mfg. Co., Milwaukee.

300 tons, building, New York city, for Washburn Wire Co., to Jones & Laughlin Steel Corp., Pittsburgh.

300 tons, alterations to International Furniture Co. warehouse, Pittsburgh, to Levinson Steel Co., Pittsburgh.

260 tons, bridge, Shelby, Mont., to American Bridge Co., Pittsburgh.

250 tons, gates and service bridge, Augusta, Ga., to Virginia Bridge & Iron Co., Roanoke, Va.

250 tons, warehouse, Owens-Illinois Glass Co., Streator, Ill., to Ingalls Iron Works Co., Birmingham, Ala.

225 tons, bridge, Osawatomie, Kans., to Mississippi Valley Structural Steel Co., Decatur, Ill.

205 tons, bridge, E. R. P. No. 2, Arapahoe county, Colorado, to American Bridge Co., Pittsburgh.

200 tons, state highway bridge, Flat Rock, Mich., to R. C. Mahon Co., Detroit.

200 tons, building, Ohio Boxboard Co., Rittman, O., to Burger Iron Co., Akron, O.

180 tons, state highway bridge, R. C. 3622, highway 869, Middleville village, Herkimer county, New York, to McClintic-Marshall Corp., Bethlehem, Pa., M. R. Ingraham Inc., Albany, N. Y., general contractor, opening of Sept. 17.

175 tons, state highway bridge, Middleville, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

150 tons, shapes and bars, bridges, Gilsum and Swancey, New Hampshire, to McClintic-Marshall Corp., Bethlehem, Pa., and Concrete Steel Co., New York; through R. H. Newell Co., Uxbridge, Mass.

130 tons, gantry crane, specification 1738, water and power department, Los Angeles, to Harnischfeger Sales Corp., Milwaukee, Wis.

125 tons, bridge, E. R. P. No. 1, Arapahoe county, Colorado, to Minneapolis-Moline Power Implement Co., Minneapolis.

110 tons, postoffice, Whittier, Calif., to unnamed interest.

110 tons, bridge, No. 278-I, Lincoln county, Colorado, to American Bridge Co., Pittsburgh.

110 tons, Children's hospital, Mount Morris, N. Y., to F. L. Heughes & Co., Rochester, N. Y.

100 tons, tunnel forms, specification 127, metropolitan water district, Los Angeles, to Penn Iron & Steel Co., Los Angeles.

Unstated tonnage, shapes and bars, administration building, Cape Cod reservation, Massachusetts, to J. E. Cox Co. Inc., Fall River, Mass., and Truscon Steel Co., Youngstown, O.

Shape Contracts Pending

12,000 tons, vehicular highway, Forty-ninth to Forty-seventh streets, New York; specifications soon.

7500 tons, four schools, New York; bids on first Oct. 15.

4000 tons, largely piling, pier, Boston; bids soon.

3500 tons, buildings, Bellevue hospital, New York.

2700 tons, extension west side highway, Seventy-sixth to Seventy-ninth streets, New York; bids soon.

2600 tons, seven bridges, New York Central; bids soon.

1850 tons, state bridges, Texas.

1800 tons, steel sheet piling, structural steel, and reinforcing steel, alterations consisting of eight vertical gates in the main channel dam and six in the back channel dam, Emsworth, Pa., lock and dam, Ohio river near Pittsburgh; bids Oct. 25 to federal engineers, Pittsburgh.

1500 tons, including 1200 tons of piling, lock, Peoria, Ill.; bids to United States engineers, Chicago, Oct. 22.

1400 tons, state bridges, Iowa.

1150 tons, shapes and bars, additional buildings, veterans' hospital, Waco, Tex., T. L. James & Co., Ruston, La., low on general cntract.

600 tons, piling, Black river dam, Onalaska, Wis.; bids Nov. 18 to United States engineers, St. Paul.

540 tons, Pendleton county bridge, Butler, Ky., Lackawanna Steel Construction Corp., Buffalo, low.

500 tons, two projects for the navy department in Panama, one at Coco Solo and the other at Balboa.

450 tons, state bridges, Oklahoma.

430 tons, piling, eleventh naval district, San Diego, Calif., for Wilson Cove pier; bids opened.

380 tons, state highway bridges, Kentucky.

350 tons, Sixty-ninth street terminal, Philadelphia; bids to be opened this week.

325 tons, piling, shipway, Philadelphia navy yard; bids opened Oct. 2.

300 tons, postoffice, Winston-Salem, N. C.; Virginia Engineering Co. Inc., Newport News, Va., low, bids Sept. 27.

300 tons, contract No. 88, buildings for easterly sewage disposal plant, Cleveland; also 380 tons, of reinforcing bars and 100 tons of miscellaneous steel.

300 tons, state highway bridge, Canisteo, N. Y.

300 tons, beam spans, various locations, for Missouri Pacific railroad.

290 tons, Penn township school, Pittsburgh; William Miller Co., Pittsburgh, low.

290 tons, state grade separation, Lansing, Mich.

250 tons, tunnel ribs, metropolitan water district, Los Angeles; specification 131; bids Oct. 30.

215 tons, also 35 tons of bars, truss bridge, Wyoming county, Pennsylvania; bids Oct. 18.

200 tons, seaplane hangar, for United States government, Charleston, S. C.

182 tons, state highway bridge, Kane borough, McKean county, Pennsylvania; Graham Construction Co., Lancaster, Pa., general contractor. Project includes 82,679 pounds of plain steel bars.

125 tons, juvenile court building, Pittsburgh; bids in.

112 tons, 87 tons shapes, 25 tons, bars, bridge, Pennsylvania railroad, Dover, Del; bids Oct. 8 at Philadelphia.

Unstated, three grade eliminations in Cuyahoga county (Cleveland); $580,000 allotted by PWA.

Unstated, steel truss state span, 152 feet, Jefferson county, Washington; bids at Olympia, Wash., Oct. 15.

Unstated, Marias river bridge and overpass at Helena, Mont.; bids to state highway commission, Helena, Oct. 11.

Unstated tonnage, 13 schools, Philadelphia, with bids on at least two projects to be opened Nov. 6.

Reinforcing

Reinforcing Bar Prices, Page 67

New York—Heavier buying of reinforcing steel is accompanied by substantial new inquiry, notably for highways and bridges. New York state closes on an additional group of projects this week, taking several hundred tons. Also due to be bid Oct. 10 is the Randalls Island junction, Triboro bridge, New York, close to 5800 tons. Prices are easier, increasing competition for the more attractive contracts bringing out concessions.

Pittsburgh—A large but unstated tonnage of mesh and bars is included in the Pennsylvania state letting for Oct. 11. Graham Construction Co., Lancaster, Pa., will buy 82,679 pounds of plain steel bars in connection with work in McKean county on which it was low bidder to the state, Sept. 27. Reinforcing steel bars are quoted 2.05c, base, Pittsburgh, by distributors for carload lots.

Cleveland — Although recent awards have been light several substantial tonnages have come up for figures, two of them being industrial projects. Bids are being taken on 500 tons for the Ford Motor Co.'s coke oven plant at Dearborn, Mich., and on 400 tons for two units of Chevrolet's commercial body plant, Indianapolis. Contract No. 88 for additional buildings at Cleveland's easterly sewage disposal plant, bids Oct. 17, call for 380 tons of bars, 300 tons of shapes, and about 100 tons of miscellaneous steel items. On bids to the FERA for 150 tons, two out of 14 sellers offered to absorb freight charges.

Boston — Sharp increase in reinforcing steel activity is assured by bids on grade crossings, bridges and other PWA work within the next few weeks. Meanwhile more work is being figured and pending requirements are heavier, although awards are light. Prices are unsettled.

Chicago—Concrete bar shipments are fairly active but new awards are light and delays still are encountered in the taking of bids on certain public projects, including Illinois highway and grade separation work. Milwaukee is asking for bids on 1800 tons for a second section of its filter plant, with an additional 1000 tons pending for a housing project in that city.

Philadelphia — Reinforcing bar business is more promising, with bids to be opened Oct. 16 on 1100 tons for further work on the Reading, Pa., reservoir, and 4000 tons to be required for 13 new schools for which the board of education has just given approval. Bids on the first two schools will be closed about Nov. 6. Close to 5000 tons of road work, involving 122 projects for the state of Pennsylvania, will supply sellers with business over the next few months, with initial work to come out this month. Prices are somewhat stronger than recently.

San Francisco—Bar lettings were the smallest in over a month, less than 900 tons being placed. Interest centers in the opening of bids Oct. 24 for a pipe line for the metropolitan water district, Los Angeles, involving either precast reinforced

Concrete Awards Compared

	Tons
Week ended Oct. 5	2,559
Week ended Sept. 28	6,493
Week ended Sept. 21	14,648
This week, 1934	2,409
Weekly average, 1934	4,084
Weekly average, 1935	6,732
Weekly average, September	28,497
Total to date, 1934	189,533
Total to date, 1934	270,004

LINK-BELT

CHAINS
SPROCKETS
BUCKETS
for
MATERIALS
HANDLING

Made of PROMAL - MALLEABLE IRON - STEEL

FOR smooth operation and long life with maintained efficiency—for real economy in the severest conveying and elevating service, use this wear-resisting combination.

Investigate Promal, the stronger, longer-wearing metal for chains and buckets. It lasts several times as long as malleable iron and costs but little more. Send for catalog.

LINK-BELT COMPANY 5376-B

The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power

CHICAGO PHILADELPHIA INDIANAPOLIS ATLANTA SAN FRANCISCO TORONTO

Offices in Principal Cities

concrete pipe or cast-in-place reinforced concrete pipe. If precast pipe is specified, contractors will be required to supply 16,850 to 22,350 tons of bars. If cast-in-place pipe is used the district will furnish 20,818 tons of reinforcing bars and 906 tons of plate lining.

St. Louis—Business in concrete bars has picked up under stimulus of broadening public works and other projects. The largest letting is 1800 to Laclede Steel Co., St. Louis, for the substructure of the new St. Louis postoffice.

Seattle — The largest tonnage pending in this area totals 3500 tons for the powerhouse and fish ladder at the Bonneville, Oreg., project, bids Oct. 8. Inquiry for reinforcing materials continues slow. A. W. Quist Co., Seattle, has the contract for a $40,000 business building, Seattle, requiring a small lot.

Reinforcing Steel Awards

1800 tons, St. Louis postoffice, to Laclede Steel Co., St. Louis.
350 tons, addition to high school, San Pedro, Calif., to unnamed interest.
200 tons, baseball stadium, Phoenix, Ariz., to unnamed interest.
100 tons, library addition, teacher's college, Tempe, Ariz., to unnamed interest.
100 tons, mesh, highway, Ithaca-Danby, Tompkins county, New York, to Wickwire-Spencer Steel Co., New York; through Bero Engineering & Construction Corp.

Reinforcing Steel Pending

4000 tons, 13 schools approved, Philadelphia, with bids on first two projects Nov 6.
3500 tons, powerhouse and fish ladder, Bonneville, Oreg., project; bids to United States engineer, Portland, Oct. 8.
1800 tons, second section, Milwaukee filter plant.
1100 tons, additional section, reservoir, Reading, Pa.; bids Oct. 16.
1000 tons, housing project, Milwaukee.
550 tons, grade eliminations, Stapleton-Tompkinsville, Staten Island, New York; Faircroft Engineering Corp., low.
500 tons, foundation, coke oven plant for Ford Motor Co., Dearborn, Mich.
450 tons, second section sewage treatment plant, Hartford, Conn; F. H. McGraw & Co., New York, low.
400 tons, foundations, units A and B, commercial body plant for Chevrolet Motor Co., Indianapolis; bids Oct. 7.
380 tons, contract No. 88, additional buildings at Cleveland's easterly sewage disposal plant; bids Oct. 17.
285 tons, shipway, Philadelphia navy yard, bids opened Oct. 3; 325 tons of piling for same project opened Oct. 2.
250 tons, Rahway valley, New Jersey, sewage treatment plant; George Kelley Co., Yonkers, N. Y., low.
117 tons, Black river dam, Onalaska, Wis.; bids Nov. 8 to United States engineers, St. Paul.
115 tons, siphons for water works project, Denver; bids Oct. 7.
Unstated, overpass, culverts and bridges in Oregon; bids to state highway commission, Portland, Oct. 8 and 9.
Unstated, two railroad overpasses in Washington; bids to state highway commission, Olympia, Wash., Oct. 15.

QUALITY CASTINGS

Cylinder Base and Cover for Steam Turbine

Rolled Steel Wheels — Rolled Steel Rings and Flanges
Forgings — Steel Castings — Steel Tires
Springs — Gear Blanks

STANDARD STEEL WORKS COMPANY
BURNHAM, MIFFLIN CO., PENNA.
Branch Offices
New York — Philadelphia — Portland, O. — Chicago — St. Louis — San Francisco

Wire

Wire Prices, Page 67

Pittsburgh — A noticeably heavier volume of merchant wire product specifications was entered on mills' books up to Oct. 1 for shipment through October under the old price schedule. Since Oct. 1, producers have been quoting uniformly on all spot business under the new quantity differentials. Buying of rods, manufacturing wire, and spring wire is still heavy from automotive parts' manufacturers, and the miscellaneous consuming trades are steadily improving their wire product specifications. Nails are now quoted $2.40 per keg, base, but plain manufacturing wire remains unchanged at 2.30c, and spring wire at 2.90c. Sept. 27 bids on 2000 feet of highway guard fence for the Tygart river dam have been rejected and will be re-advertised with modified specifications.

Cleveland—The market for manufacturers' wire is exceptionally strong, as inventories are low and industrial requirements are experiencing fresh impetus. Hardware jobbers have been placing larger tonnages. Demand for fencing is a little slow, pending issuance of spring terms, expected in two or three weeks.

Chicago — Manufacturers' wire demand continues to gain gradually. Betterment in automotive needs is small and below expectations, but business from other directions is holding well. Jobbers still are slow to increase purchases of wire products despite favorable prospects for fall buying by consumers. Differences between jobbers and producers over the new system of quantity extras are expected to be ironed out shortly.

Boston — Wire buying continues brisk with most volume in specialties, manufacturers wire and special cable. Mill operations are up slightly. Heavier products are lagging behind those entering into manufactured consumer goods while merchant wire buying is light.

Philadelphia — While buying of manufacturers' wire is less than a few weeks ago, considerable tonnage continues to be booked for agricultural districts in the southwest. Further, nail demand continues to hold the somewhat improved rate of the past several weeks, due to better residential building. Prices are unchanged.

San Francisco—The metropolitan water district, Los Angeles, opened bids on 2004 tons of aluminum con-

ductor cable for a transmission line and Columbia Steel Co. and Aluminum Co. of America, submitted identical bids at $614,317. Alternate bids were also taken on 3080 tons of copper wire and Phelps-Dodge Copper Products Co. and Anaconda Wire & Cable Co. submitted identical bids at $828,716. An award is expected within a few days.

Pig Iron

Pig Iron Prices, Page 68

Pittsburgh—The local market still fails to share the improvement recorded in other districts, notably through the west. Practically no fourth-quarter contracts have been negotiated by pig iron users and they continue to buy as needed. Consequently, pig iron orders at present are rarely more than carloads. In all likelihood, pig iron producers will soon be faced with increase coal and coke costs, in view of the settlement in the recent coal strike, but pig iron prices show all evidence of continuing at $18.50, Pittsburgh district furnace, for foundry grade, $18 for basic, and $19 for bessemer. Full application of silicon differentials is reported.

Cleveland — With charcoal iron and by-product foundry coke prices advanced 50 cents a ton, and scrap continuing strong, it is generally expected that foundry, malleable and other grades of pig iron will be raised shortly, although sellers have not actually determined the date. Steelworks furnaces still are active in the merchant market. September was one of the best months in years from the standpoint of furnace bookings, and melters generally have covered their requirements for part or all of the third quarter, new entries now being in lighter volume. Shipments in the first week of October, however, have continued the rising trend, automobile and railroad foundries taking more material. Shipments still are going forward by vessel from a Cleveland steelworks to General Motor's plant at Saginaw, Mich.

Chicago—Substantial pig iron shipments are in prospect this quarter as producers' backlogs are the heaviest in more than four years. Part of such forward buying has been predicated on the likelihood of a price advance and the iron may not be taken out until late this year, but rising foundry schedules will account for substantial deliveries during October and November. Operations of automotive foundries have been restricted in some instances by delays in assembly schedules, but this situation is expected to be relieved shortly. Operations in other industries are steady or higher. Charcoal pig iron has been advanced 50 cents, making the Lake Superior furnace price $21.50, and the delivered quotation here $24.75.

Boston—Stocks of foreign pig iron, to be sold largely from storage, are the heaviest in months, following the arrival of recent cargoes at Boston, Providence, R. I., and Bridgeport, Conn., an estimated 7500 tons. Most of this is Dutch iron. Domestic shipments are steady in small lots while consumers purchase as needed.

New York—Prospects in pig iron appear to be even better for this month than last, notwithstanding some future covering in recent weeks because of labor unsettlement in coal. The foundry melt in this district is expanding steadily, although slowly, and sellers generally report a good diversification of orders. Prices are strong and an advance by next quarter appears all but assured.

Philadelphia—Pig iron buying is in good volume, following a month in which business was at high level. Notwithstanding the disposition of some consumers recently to cover in anticipation of the coal strike, there

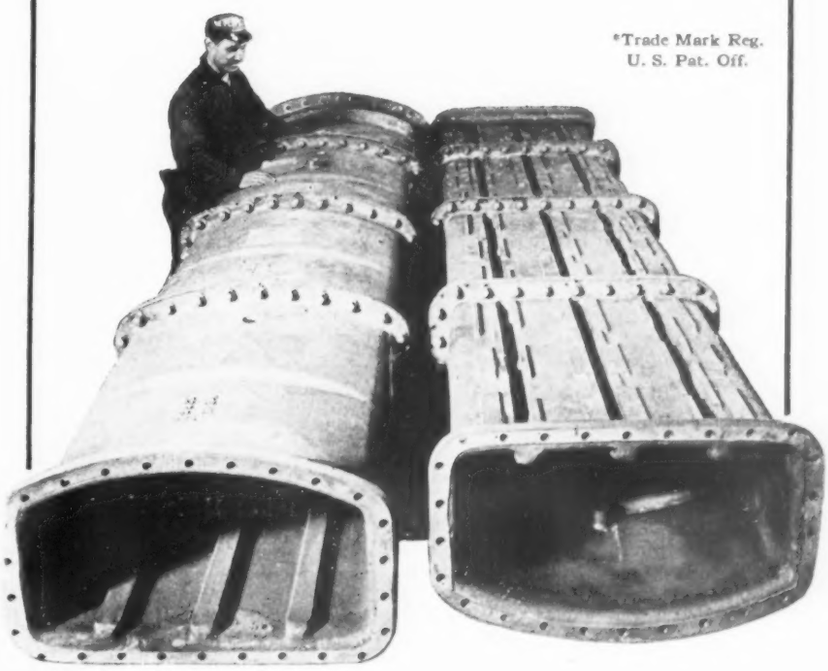
2½ Ton Muffle

Two and one half ton muffle . . . . . an ounce casting . . . . . all sizes are alike to the Driver-Harris Foundry. The same precision and care is given to every casting. That is why "Chromax", "Cimet" and "Nichrome" are used in hundreds of plants, for these plants know that a quality casting brings quality results.

DRIVER-HARRIS COMPANY
Harrison, N. J.

# of CHROMAX*

*Trade Mark Reg. U. S. Pat. Off.



appears to be about as much tonnage coming out as heretofore, with the melt gradually expanding and prospects brighter for still further buying. Arrivals of pig iron from British India have featured recent importations, possibly 3000 tons or more having come in here. Thirty-two hundred tons of Dutch iron, foundry and malleable, are scheduled to arrive within the next several days. Domestic prices are steady.

Washington — Inquiry for 200 tons of foundry pig iron for delivery, Mare Island, Calif., closing Oct. 15, is included in schedule 6082, bureau of supplies and accounts, navy department.

Buffalo—September shipments of iron were close to peak of the year. Fourth quarter bookings are the largest since just before NRA's coming forced heavy buying. The feeling among foundrymen that commodities were worth more than dollars led to heavy buying just before the beginning of the new quarter. Eight furnaces are in production. Covering for fourth quarter is general and there has been considerable speculative buying in the past ten days.

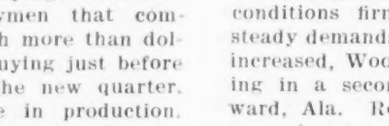
Cincinnati—Shipments of pig iron are close to September levels, some mand for southern iron. Total tonnage on contract is moderately greater than at a corresponding period of third quarter, and may include some speculative buying.

St. Louis—Recent activity in pig iron shows no signs of abating, both shipments and buying being on an extensive scale. Reports from distributors indicate a September volume about 50 per cent above August and more than double that of September, 1934. Sellers report that some customers who had presumably covered requirements in August and early September are now inquiring and in many instances purchasing additional tonnages. This is taken to indicate that the iron is actually going into consumption currently, though in a number of cases foundry reserve stocks have been substantially augmented since mid-August.

Birmingham, Ala.—With market conditions firm and indications of steady demands, production has been increased, Woodward Iron Co. blowing in a second furnace at Woodward, Ala. Republic Steel Corp. is preparing a second furnace also for operation. Local melters are placing numerous spot orders and prompt delivery is being given. Five blast furnaces are now producing foundry and two of the larger furnaces are on basic iron.

Toronto, Ont.—New business continues to expand. Sales for the week totaled 700 to 800 tons. The daily melt is holding at 45 to 50 per cent, with indication of further improvement before the year end.

A New Coupling!



Saves Assembling & Mounting Costs

Note These Advantages

1. Self-aligning.
2. Perfect flexibility.
3. Balanced for high speed.
4. Highest efficiency even at maximum misalignment.
5. Angular misalignment up to 6°.
6. Parallel misalignment 1/16" to 3/16".
7. Runs on sprung shaft.
8. Minimum protection needed against grit, dirt or water.
9. Durable safety covers.
10. Adds astonishingly to bearing and motor life.
11. Silent at all speeds.
12. Neat and trim in appearance.

ALLOY PRODUCTS CORP.
Waukesha, Wis.

Scrap

Scrap Prices, Page 69

Pittsburgh—In the consistently heavier offerings of railroad scrap for October and the lukewarm attitude of consuming mills here toward higher prices, market observers foresee a likelihood that the market will remain at its present level over the near future. Developments in the market last week found an important down-river mill taking in a large tonnage by barge from Oklahoma, Texas, and Louisiana districts, a Pittsburgh district mill lifting a two-week scrap embargo Sept. 30, and the definite assurance by now that at least two other independents will be out of the market until early 1936, due to their heavy recent purchases of scrap. For local delivery, both No. 1 heavy melting and hydraulic compressed sheet scrap are holding at $13.50 to $14, machine shop turnings, $9.75 to $10.25, and railroad steel specialties, $16.50 to $17.

Cleveland—With fair shipments of heavy melting steel to outside points most steel scrap consumed close to Cleveland is lighter grades. Foundry demand for cast scrap is increasing. Prices are steady.

Chicago—Consumer prices of scrap remain steady despite a downward tendency in brokers' bids. The latter is reflected in lower quotations on railroad lists and results from increasing offerings of scrap from most directions. Old material is coming out faster than necessary to meet consumers' needs and some mills are restricting shipments. While new buying is light, heavy melting steel remains quotable at $12.25 to $12.75, and other quotations are unchanged.

Boston—Scrap buying for export is less active with prices easier. Against contracts, shippers are taking little heavy melting steel, paying $9 to 9.25 for No. 1. This is approximately $1 a ton less than the best price offered two weeks ago. Domestic buying is slack with prices unchanged. Following another 25-cent advance, dealers now pay $13 to $13.25, shipping point for shafting.

New York—Uncertainty marks the export scrap market, shippers being more cautious in booking foreign business, especially for Italy. While some buying against contracts continues at unchanged prices, domestic shipments are unchanged, although not heavy, most of latter being from northern New Jersey. Prices are steady with machinery and No. 2 cast for nearby delivery slightly stronger.

Philadelphia—Melting steel scrap

is easier with No. 1 now holding at $12, and No. 2 at $11 to $11.25, delivered, district consuming point. The Claymont, Del., consumer has closed on several thousand tons of No. 1 steel at $12, material which came into the district by barge, and the Phoenixville, Pa., consumer has also closed on a fair tonnage at this price. More is being offered at $12. Two or three sales of No. 2 scrap have been made at the slightly lower levels indicated. Certain cast grades, such as stove plate and some off grades, are easier in price, although no actual changes in the market ranges have been made. Notwithstanding this easier trend, the underlying tone of the market is still fairly strong, with scrap offerings by certain producing companies in the district recently indicating no marked weakness in the general situation.

The Clyde-Mallory freighter Pecos has been sold to Italy for breaking up as scrap.

Buffalo—A market of great theoretical strength has developed here. The three largest holders of No. 1 heavy melting steel will not sell for less than $13 under any circumstances, they claim, and will advance their price as tonnage is sold, they assert. Mills undoubtedly are importing much scrap by water but are nearing the end of the navigation season and must purchase locally within 30 days, it is claimed. All markets are at a standstill so far as tonnage dealing is concerned but small lot transactions tend to establish rapidly rising prices.

Detroit—The tone of the iron and steel scrap market is a little heavier. Offerings by automobile manufacturers are increasing as new models swing into heavy production, and consumer demands have not increased proportionately. Some holdups from Mahoning Valley melters have been received. A local yard has sold its inventory of steel scrap to a local steelworks. Water shipments to Cleveland and Buffalo continue fair, but against old orders.

Cincinnati—A small tonnage of miscellaneous iron and steel scrap sold to an important consumer failed to reflect any further strength in the market, although several items were readjusted upward during the past week in sympathy with other districts and dealers' bidding. Material is closely held as dealers, noting a rise in steelworks operations, continue hopeful. Foundry grades are strong and active.

St. Louis—In face of backward contracting by mills, the market for iron and steel scrap is firm with several specific price advances.

The principal feature in the situation continues to be strength of cast grades, including malleable. Active demand exists for this material, which is not available in quantities.

Seattle — The market is quiet, export houses receiving no encouragement from Japan. The situation has been complicated by threatened labor troubles which may interfere with shipping. Local stocks are low, dealers finding no incentive to absorb offerings from the country. Domestic demand is nominal, in small tonnages. Prices are unchanged.

Birmingham, Ala.—Better feeling is again noted in the iron and steel scrap market in the Birmingham district as purchasing is more active, even the larger consumers taking some tonnage. Quotations are firm and unchanged.

Toronto, Ont.—Demand for iron and steel scrap is holding steady, most new business being in steel grades for mill consumption. Local dealers state that some large tonnages of heavy melting steel have been shipped to the Hamilton district recently and the Steel Co. of Canada is taking regular deliveries. There also has been minor improvement in demand for turnings, but yard stocks still are heavy. Steel rails and car wheels have some call and holdings by dealers are somewhat limited. No. 1 cast scrap and wrought scrap are the most active grades, but there is some call for malleable in small lots. Prices are firm.

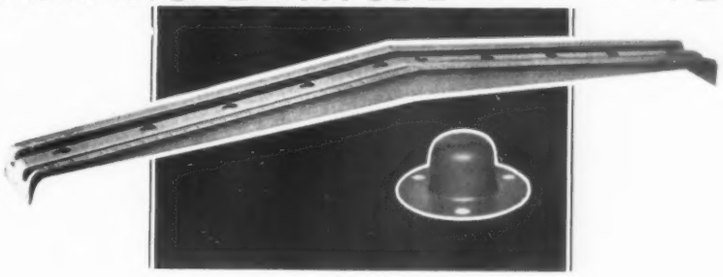
Warehouse

Warehouse Prices, Page 70

Pittsburgh—Effective Oct. 1, warehouses advanced hot-rolled bars in rounds, square edged flats, and angles (under 3 inch) 5 cents to 2.95c, base, for city delivery, and 2.85c for country shipment. All other hot-rolled bars, including squares, hexagons, ovals, half ovals, round edged flats half rounds, channels (under 3 inch), tees, zees, and high carbon rounds, were advanced 20 cents to 3.10c for city shipment, and 3.00c for country shipment. Revised quantity extras were put into effect on cold-rolled bars, differing slightly from those in effect for other districts as regards the bracket under 300 pounds and under 100 pounds.

Cleveland—Steel bars have been advanced $1 a ton to 3.00c, Cleveland, in conformity with the increase in the mill base, but warehouses have not changed the price of galvanized sheets, although mills eliminated their allowances Oct. 1. In cold finished steel the only price

STAMPING LATITUDE » » » PLUS



TO permit a universal solicitation of *the difficult* in steel stampings necessitates an enormous productive range in presses. Parish masters this essential by maintaining a battery of presses producing parts under as little as 50 tons or as much as 4000 tons pressure and from plate as thin as 1/32 inch or as thick as 1/2 inch.

These facilities together with a complete engineering service are yours—whether for straight stampings in large quantities or composite design in small quantities . . . May we study *your* blue prints and specifications?

PARISH PRESSED STEEL CO.

Specialists in difficult stamping design

Robeson & Weiser Sts., READING, PA.

Pacific Coast Rep.: F. Somers Peterson Co., 57 California St., San Francisco, Cal.

changes are the quantity differentials, in accordance with the new mill schedules, previously announced. September tonnage was about equal to that of August, and recently a moderate improvement has set in.

Chicago—Jobbers have advanced bar prices and adopted size extras similar to those introduced recently by mills. Rounds, flats and fillet angles now are 3.00c, up 5 cents per 100 pounds, while all other bar shapes have been raised to 3.15c. Base prices on other products are unchanged. Business continues moderately active. September showed a fairly substantial gain over August with further improvement seen for October.

Boston—Volume holds to the current rate, a strong finish last month putting most jobbers' totals close to the previous month. A steady volume of small orders make up the bulk of business, with specialty lines moving well in small lots. Prices are unchanged, and, with few exceptions, fairly firm.

New York—Advances of $1 to $4 a ton on several products out of warehouse, follows a revision of the price list in line with recent changes in mill size and quantity extras. Products involved are hot rolled carbon bars, bar shapes, cold finished and blue annealed, the latter now being included in the quantity extra plan but with the base price unchanged. A 50-cent differential between cold finished rounds and flats was eliminated, all finishes now being 3.81c. These revised prices became effective Oct. 1, and volume several days previous was heavy, with numerous consumers purchasing in anticipation of the advance.

Philadelphia—In addition to the recently noted advance of $2 a ton in the base price on soft bars and changes in extras on cold-finished steel to conform with mill revision, prices were marked up $2 a ton Oct. 1 by leading jobbers on tire steel to 3.85c for the heavier sizes and 4.65c for the lighter, and $1 a ton on hot rolled bars S.A.E. 130 and over to 3.28c. Jobbing demand is being well sustained, with October likely to show improvement.

Detroit—Steel bars are now quoted 3.09c, Detroit, an increase of $1 per ton. The level of warehouse business has been little changed since August and is high for the season.

Cincinnati—Sales of steel from warehouse this month show a gain over September and inquiries lend further optimism. A schedule of increased prices on hot-rolled bars is being prepared.

St. Louis—Miscellaneous demands dominated in September and were largely accountable for the substantial increase in volume over August and a year ago. An outstanding feature has been the call for special steels and alloys. Buying of sheets and plates by stove and farm implement industries has accounted for substantial tonnages since mid-August. Building activity has stimulated the movement of tubular goods, boiler tubes being especially brisk. Prices are unchanged.

Seattle—Warehouse business for September has been good, although seasonal demand is declining. Angles and bars are moving in fair volume, but plates are not so active. On Oct. 1 steel bars and bar-sized shapes, under three inches, were advanced 10 cents to 3.70c. The quantity extra list is also being revamped to absorb the higher cost to the jobber.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 67

Most fourth quarter contracts for bolts and nuts have been entered at the new price and a few specifications already have been received against such commitments. Demand recently has been active in the completion of shipments against lower price orders and a letdown in buying by jobbers is in prospect for a short period ahead. The bolt and nut market continues 75 off list, with large rivets holding at 2.90c, Pittsburgh and Cleveland, 3.00c, Chicago.

Jobbers and miscellaneous consumers recently have been the most active buyers at Chicago, poor demand from railroads being the exception to moderately heavy consumption. Farm implement manufacturers still are operating at a substantial rate and their requirements are well maintained.

At Cleveland, September volume was about 25 per cent better than that of August. The bulk of new business is from automobile interests. Large consumers have signed contracts for the fourth quarter, and some effort is being made to strengthen the price structure.

Tin Plate

Tin Plate Prices, Page 66

Pittsburgh—Although a few mills operate at 70-75 per cent, the average in the tin plate industry is about 50 per cent. Many canmakers' releases at present are in sizes which cannot be shipped from mills' stocks, which are unusually high. It is estimated that several million base boxes still are in hands of producing mills awaiting shipping directions from the canmakers. However, a growing market continues in beer containers, and added to this new outlet is a report that California wine producers will can approximately 1,000,000 gallons of wine this year in tin plate containers. The market continues $5.25 per base box for standard tin plate.

Cold Finished

Cold Finished Prices, Page 67

Pittsburgh—In efforts to place specifications for October shipment before Oct. 1, many buyers of cold-finished steel bars anticipated their requirements before that date and

gave producers a sizable backlog to work on through this month. Since Oct. 1, all spot business is carrying the new list of extras, and after Nov. 1 all cold-finished bar business, contract and spot, will be billed with the revised quantity extras. The Pittsburgh base price on carbon cold-finished bars holds steady at 1.95c, alloy quality at 2.95c.

Iron Ore

Iron Ore Prices, Page 69

Cleveland—Pittsburgh Steamship Co., Great Lakes subsidiary of the United States Steel Corp., has reduced the number of its vessels in commission from 42 to 36, but this does not mean it has changed its schedule for the tonnage of ore it will ship this year. The lake draft is up 6 inches, and this will enable it to carry the same amount as it originally intended, with fewer boats. The company has awarded American Shipbuilding Co. contract for reboilering three vessels. The number of vessels in the ore trade Sept. 15 was 174, and the standing of Oct. 15 probably will show a few other reduction besides those of the Pittsburgh company.

Actual ore shipments in September totaled 4,817,614 tons, compared with STEEL's preliminary estimate of 4,900,000 tons. Total for the season to Oct. 1 is 22,204,213 tons, 16 per cent more than in the period last year.

Ferroalloys

Ferroalloy Prices, Page 68

Ferromanganese specifications are slower following a substantial movement last month. Prices are unchanged at $85, Atlantic and Gulf ports. Should the Italian-Ethiopian war be prolonged higher prices appear likely for the next quarter, it is said, notwithstanding possible early enactment of the Brazilian reciprocal treaty which would reduce the tariff on manganese ore from principal foreign sources. Domestic spiegeleisen prices are unchanged.

Metallurgical Coke

Coke Prices, Page 67

Producers of beehive coke have advanced prices 30 cents per ton to compensate for advanced cost of coal. This brings furnace coke to a spread of $3.55 to $3.70, Connellsville ovens; common foundry coke to $4.30 and premium foundry to $5.30 to $5.65, Connellsville ovens.

Shipments of by-product foundry coke have been smaller at Chicago because of defensive buying earlier, as the coal strike threatened. The October contract market has been advanced 50 cents, to $9, ovens, for outside delivery, and $9.25, delivered, Chicago. St. Louis melters continue to take good tonnages and are covering for future delivery. At Birmingham, Ala., demand and production continue unchanged, in spite of labor difficulties in mining.

Sellers in Brooklyn, N. Y., encounter competition from German by-product coke at $9.25 per ton delivered, against $11 by domestic sellers. An advance of 75 cents by German importers is expected.

Steel in Europe

Foreign Steel Prices, Page 70

London—(*By Cable*)—Conditions continue active in the steel and iron industry in Great Britain. Pig iron stocks are low and some contracts have been placed for January delivery. Scottish light foundries are large consumers of foundry iron. Producers of semifinished steel are busily employed and sales by Continental makers under the quota are small. Slow improvement is noted in steel exports, with slight gains in galvanized sheets, especially to India. Tin plate exports are fair, especially to South America.

The Continent reports export markets quiet with Holland and Scandinavia showing interest. Germany is reported to have sold 2000 tons of sheet bars for delivery to Roumania.

Nonferrous Metals

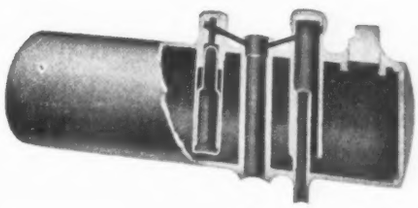
Nonferrous Metal Prices, Page 68

New York—Leading domestic nonferrous metals held steady last week despite Italo-Ethiopian war developments, rising markets abroad and rumors of possible price advances in this country. Tin prices broke sharply.

Copper—Leading producers continued to quote 9.00c, Connecticut, for electrolytic. The market may change suddenly, especially if sales increase, since foreign quotations gradually moved upward to close fractionally below the domestic market. Consumption maintains better than seasonally normal rates.

Zinc—Buying was confined to regular customers but total sales for the week are expected to make a fair showing. Prices were firm at 4.75c, East St. Louis, for prime western.

CROSBY STAMPINGS



Forty years of concentration on producing Metal Stampings, exclusively, has given us a wide experience which is available to you.

If you have never used Crosby Service, let us figure on your next stamping job.

THE CROSBY COMPANY
BUFFALO, N. Y.

Branch Offices

New York Chicago Philadelphia Detroit Cleveland

Additional support was afforded the market by an advance of $1 a ton in Tri-State zinc ore, curtailed production there last week, and a steady reduction in unfilled slab zinc orders.

Lead—Most sellers easily equalled daily their ore intakes and were reluctant to dip into surplus stocks. Active demand was well diversified at the firm price level of 4.50c, New York, and 4.35c, East St. Louis.

Tin—Straits tin prices dropped to a low of 49.12½c for the week and closed around 49.75c. The decline was due to weakness in London combined with lower sterling exchange rates and expectations, which since have been realized, that tin export quotas would increase 5 points to 70 per cent of standard tonnages. Visible supplies are the lowest in about 15 years.

Antimony—Prices held unchanged at 14.25c, duty paid New York, for Chinese spot although reports were received of a firmer market in the Orient.

Refractories

Refractories Prices, Page 68

Pittsburgh—A development in the refractory brick market recently has been the release by Jones & Laughlin Steel Corp. for material to reline an Aliquippa, Pa., stack and at least three stoves. Fourth quarter markets find fire clay material quoted unchanged at $55 per 1000 for super quality, Pennsylvania works; $45 for first quality and $40 for second quality. Base prices on silica, malleable bung, magnesite and basic brick are unchanged and most going transactions, especially on the better grades, are at full market levels. On second quality, and especially in Ohio, prices are weak.

Quicksilver

New York—Quicksilver prices are unchanged in a quiet market. Round lots of 100 virgin flasks are $69.50 a flask, and small lots of 15 to 24 flasks, inclusive, $70.50.

Men of Industry

(*Concluded from Page* 26)

May 1, 1887, he started as an assistant chemist at the Edgar Thomson works of Carnegie Steel Co. Five years later he was transferred to the Homestead works of the Carnegie company as chief chemist.

In 1895 he was appointed assistant superintendent of the armor department of the Homestead works, and was later promoted to superintendent of the armor department in 1897, which position he held until designated assistant general superintendent of the entire Homestead works in 1905. On Dec. 1, 1908, he was appointed manager of the central research bureau of Carnegie Steel Co., in which capacity he served until his retirement Oct. 1.

Dr. Unger was married in 1892, and has a son, William S., who is following in his footsteps. At present, the latter is assistant general superintendent at Homestead.

Dr. Unger is a member of all Masonic bodies, the Country Club of Pittsburgh, Railway club, chamber of commerce, and a member of technical and scientific societies, among which are the British Iron and Steel institute, American Iron and Steel institute, American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials, American Society for Metals, Engineers' Society of Western Pennsylvania, and American Railway Engineering association.

◆ ◆ ◆

P. E. Welton, of the Universal Engineering Corp., Akron, O., has been appointed special representative for the rubber industry for the Foote Bros. Gear & Machine Co., Chicago. He will work in conjunction with R. K. Plummer, the company's direct factory representative in northern Ohio.

Ore To Feel War Reaction First

(*Concluded from Page* 19)

through the Mediterranean, particularly the Caucasian, Indian and North African ores, hence the sharp increase in the insurance rates. Interestingly, many empty boats are in dock along the eastern seaboard, their owners showing little interest in cargoes at this time in the belief that shortly ocean rates will advance sharply and much more profitable tonnage can be booked.

The situation with regard to manganese ore is being particularly watched because of the reliance of American consumers on foreign manganese, and, of course, Russia over past years has been the principal source.

This material normally moves through the Mediterranean, and for this reason especially an increase in manganeses ore prices from that country is expected fairly soon.

So far this year approximately 120,000 tons of Caucasian manganese have been received here, which compares with 132,739 tons shipped to this country from Russia in all of last year, 93,450 tons in 1933, and 30,466 in 1932.

Germany has been the largest consumer of Russian manganese ore over the past year and a half or so. In 1934 she took 200,360 tons, a sharp increase from 65,132 tons in 1933 and 29,222 tons in 1932. Her purchases for this year are understood to be comparable with last year.

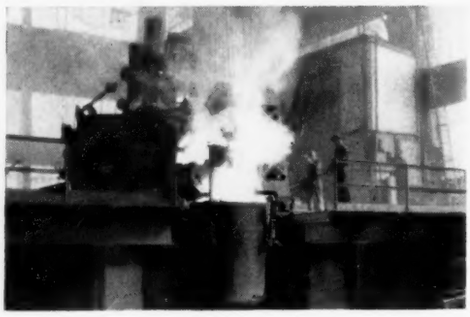
Italy took only 36,776 tons last year, 45,517 the year before and 29,637 in 1932. Her purchases of Rus-

THE STARTING POINT *of*

NF

FORGINGS

CARBON-ALLOY AND SPECIAL BASIC ELECTRIC STEELS



COMPLETE control of all processing from selection of the melting charge to the finished condition is the N. F. & O. *guarantee of quality* in forgings furnished to your specifications—Smooth Forged, Hollow Bored, Rough or Finish Machined.

NATIONAL FORGE AND ORDNANCE CO.

IRVINE, WARREN COUNTY, PENNA., U. S. A.

sian manganese for this year have not been reported.

France bought 132,440 tons last year, 156,111 in 1933, and 79,128 tons in 1932. Belgium, Japan and Poland were the other principal buyers but with the average annual requirements for the past three years substantially under those above mentioned.

Undecided if Steel Is Contraband

WASHINGTON

THERE is much talk and speculation behind closed doors at the state department in connection with the possibilities of steel, copper, and other commodities being declared contraband in view of the Italo-Ethiopian war.

It is pointed out, in the first place, that while embargoes have been placed on war materials during the past few years in connection with South American countries, in no instance have these embargoes included steel or any other commodity, other than straight arms and ammunition.

The other view on the situation is that if the League of Nations should declare a contraband list which included steel, it would probably be necessary for President Roosevelt to include this and any other commodity included in the League list. This, of course, is pure speculation, but all angles of the situation are being discussed at this time.

The next move by the new munitions control board is the issuance of rules and regulations for the export of arms and ammunition. It is expected that these will be available this week.

(See STEEL for Sept. 30, p. 8.)

Schwartz Places Nine on Scrap Export Board

Benjamin Schwartz, director-general of the Institute of Scrap Iron and Steel Inc., and secretary of the American Scrap Exporters conference, last week named nine exporters to the advisory board of the conference. The board includes the following:

M. F. Berg, Berg Iron & Metal Co., Los Angeles; M. V. Bonomo, Schiavone-Bonomo Corp., New York; Harry Cohen, H. Cohen & Co., Chelsea, Mass.; David J. Joseph, the David J. Joseph Co., Cincinnati; Max Luria, Luria Bros. & Co. Inc., New York; E. B. Michaels, Hyman-Michaels Co., Chicago; Morris Schapiro, Boston Iron & Metal Co., Baltimore; David Strauss, Continental Iron & Steel Corp., New York; and Hiram Winternitz, Charles Dreifus Co., Philadelphia.

It is planned to hold a meeting of the advisory board in Cleveland October 23 and 24 in connection with a special convention of the Institute, which will be held in that city at that time.

Production

REFLECTING increases of 1 to 2 points in the Pittsburgh, Chicago, Youngstown and eastern Pennsylvania districts, steelmaking advanced 2½ points last week to 53½ per cent, regaining some of the momentum lost in the preceding two weeks. This level more than doubles that in the comparable week of 1934 and also exceeds that of 1933. Further details follow:

Youngstown—Averaged 56 per cent last week, a gain of 2 points. Indications, however, point to a decline to 54½ per cent at this week's start, if tentative schedules are carried out.

Wheeling—Unchanged at 81 per cent last week, with 30 out of 37 open-hearth furnaces active. Increases by a smaller producer have been countered by a minor drop by a leading interest.

Pittsburgh—Up 2 points to 48 per cent, open-hearth improvement having been recorded by all producers. A leading producer with as many as 60 open hearths on at one time, closed the week at 42 per cent; a leading independent is now running at better than 55 per cent, and over the past week three of the smaller independent mills have each added two open-hearth furnaces. Owing to heavy specifications for carbon bars and merchant wire products, the rate may go over 50 per cent within the next two weeks.

Twenty-five out of 60 steelworks blast furnaces are now in blast here, Jones & Laughlin Steel Corp. having blown in a South Side furnace late last week. Individual blast furnace rates now include 10 of 32 for Carnegie; 8 of 11 for Jones & Laughlin; 3 of 7 for Bethlehem, and 1 each for National Tube, Pittsburgh Steel, Pittsburgh Crucible Steel, and American Steel & Wire.

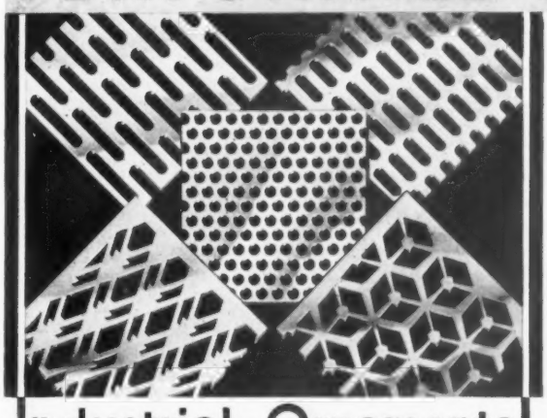
Chicago—Increased 1 point to 60 per cent which equals the previous high mark of the past seven months. A steady rate is in immediate prospect. The 14 active steelworks blast

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Oct. 5	Change	Same week 1934	Same week 1933
Pittsburgh	48	+ 2	18	38
Chicago	60	+ 1	26	48
Eastern Pa.	37	+ 1½	17	31½
Youngstown	56	+ 2	29	55
Wheeling	81	None	33	35
Cleveland	62	— 5	28	54
Buffalo	52	+ 5	24	29
Birmingham	55½	None	25	34
New England	66	+11	40	72½
Detroit	94	None	59	45½
Average	53½	+ 2½	25	38

PERFORATED METALS



Industrial - Ornamental
ANY METAL ANY PERFORATION

INDUSTRIAL—Whether your screening problems include very coarse or extremely fine materials, you will obtain the best results with perforated metal. H & K screens have increasingly served in all fields of industry for many years and established an unequaled standard in lasting performance. Regardless of size, metal or perforation, permit us to discuss your requirements with you.

ORNAMENTAL—Beauty of ornamental grilles depend largely on the experience of the designer and producer. Experience has built a complete assortment of H&K ornamental grilles that will satisfy your wants in both design and price.

Write us for further information.

The Harrington & King PERFORATING Co.

5634 FILLMORE ST., CHICAGO 114 LIBERTY ST., NEW YORK

furnaces compares with 8 stacks in blast a year ago.

Cleveland-Lorain—Down 5 points to 62 per cent. Republic Steel Corp.'s Corrigan-McKinney division took off three open hearths to operate six, while Otis Steel Co. lighted one, also to operate six. National Tube Co., Lorain, continued with 12.

Central eastern seaboard—Increased 1½ points to 37 per cent, with new units noted at three plants. Miscellaneous releases of steel are expanding and heavier output of ingots is expected before the end of the month.

New England—Up 11 points to 66 per cent last week, one producer adding an open hearth.

Buffalo—Advanced 5 points to 52 per rent last week, with 20 open hearths in production. Bethlehem is operating 14 open hearths, its entire larger battery. Other plants are operating at rates close to the average of the district and appear to have sufficient orders on hand to carry them through the month. The entire quarter outlook is highly satisfactory.

Birmingham—Steady at 55½ per cent, with 12 open hearths continuing active. Rail rolling is scheduled for a brief period this month.

Detroit—Unchanged at 94 per cent. Sixteen out of 17 open hearths in the district are melting.

Labor

FOR the first time the steel industry is confronted with the issue of a request for an increase in wages emanating from an employe representative plan, such as was created under section 7a of the national recovery act.

Last week at New Castle, Pa., employe representatives from plants of the American Sheet & Tin Plate Co., a United States Steel Corp. subsidiary, in three states met and appointed an executive committee of three to request a 15 per cent increase for all employes. Such an increase would raise the scale to approximately 1 per cent above the 1929 level.

The committee appointed to negotiate with the company consists of R. E. Glover, Farrell, Pa.; W. R. Hill, Canton, O., and Godfrey Richards, Gary, Ind.

The New Castle convention also endorsed pensions, insurance, vacations with pay, and some revision of the representative plan. In a recent election, 21,929 out of 23,769 eligible Sheet & Tin Plate workers voted.

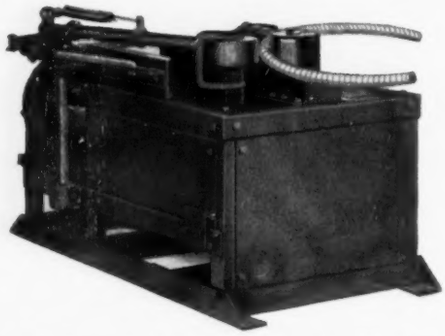
REZNOR ON 40-HOUR WEEK

Reznor Stove Co., Mercer, Pa., has adopted a 40-hour week affecting approximately 200 employes, as against the 52-hour week previously. Business is running at a level comparable with 1929, according to company officials.

STEEL EMPLOYMENT GAINS

Steel industry payrolls in August, at $47,890,277, exceeded July by 12 per cent and were the highest for any month since June, 1934, according to the American Iron and Steel institute.

Total number of employes in August was 423,925, compared with 415,937 in July. Hours per week per wage earner were 35 in August, against 31.5 in July, while average hourly earnings of wage earners were 65.4 cents in August, compared with 64.7 cents in July.



KARDONG CIRCLE BENDER

● This machine is built powerful and fast for heavy duty fabrication in both plant and field where large tonnage is required.

It will handle 20 tons or more per day and will bend bars 1¼ in size. Several bars can be bent in one operation depending on the size of bars. Circles or radius of any size required in reinforcing work from 18" up can be bent. Bars with different radius can be bent in one operation without stopping machine.

This is a time proven machine and will prove a real saving to any operator with large tonnage over any other method of bending circle or radius work.

Made in two sizes: Model "C" with capacity of 1¼" Sq.
Model "CA" with capacity of 1" Sq.

Write today for catalog 30 describing this and other bar bending machines.

Address: **Kardong Brothers, Inc.**

346 Buchanan Street, N. E. Minneapolis, Minn.

Meetings

A JOINT meeting of the Chicago district and eastern states blast furnace and coke oven associations will be held Oct. 11 at the University club, 3813 Euclid avenue, Cleveland.

Following lunch at noon a general meeting will start with presentation of two papers. A. L. Foell, chief engineer, Arthur G. McKee & Co., will discuss "Mechanical Maintenance," and W. A. Perry, chief electrical engineer, Inland Steel Co., will discuss "Electrical Maintenance."

Following these papers the meeting will divide into blast furnace and coke oven groups. James F. Lincoln, president, Lincoln Electric Co., will discuss "Electric Welding as Applied to Plant Repairs" at dinner.

PITTSBURGH P.A.'s TO EXHIBIT

Purchasing Agents' Association of Pittsburgh will hold an exhibit in the William Penn hotel, Oct. 10 and 11. Numerous entries from internationally known manufacturers have been made.

Engineers Discuss Making Of Iron and Steel

(*Concluded from Page* 16)

Metals division of the American Institute of Mining and Metallurgical Engineers..

The Iron and Steel division opened its program Tuesday morning at the Palmer House with a symposium on beneficiation of raw materials for the blast furnace. A large number of blast furnace superintendents from leading steel plants were in attendance. Later meetings featured two round table discussions, one dealing with quality of pig iron and the other with temperature measurement of liquid iron and steel. The round table on pig iron was similar to the meeting held in 1927 by this group on the same subject.

Metallurgy in Norway was the subject of an address by Carl W. Volz, Norwegian Smelting Works, Electric Furnace Products Co., presented at the annual joint dinner of the Iron and Steel and Institute of Metals divisions of the American Institute of Mining and Metallurgical Engineers, Oct. 2.

Mr. Volz described the resources of Norway, including the location and present status of ore bodies. He reviewed the development of water power and the reasons for the sudden importance of the country's hydroelectric industry, and showed how this development has influenced the metallurgical industry, particularly as to the production of aluminum, copper, nickel, iron, steel and ferro-

alloys. His remarks were concluded by a brief review of Norway's economic position with respect to Europe, and the anticipated future trend of its metallurgical development.

Thursday afternoon both divisions again met jointly to hear a paper by E. Cook, American Brake Shoe & Foundry Co., Chicago Heights, Ill., on "Open-Hearth Temperature Control." This paper, presented the following day before the American Society for Metals, prompted considerable discussion at both meetings.

New Capacity

GRANITE City Steel Co., Granite City, Ill., last week placed contracts with the United Engineering & Foundry Co., Pittsburgh, for construction of a 90-inch 4-high continuous hot strip mill and a 42-inch 4-high reversing cold mill to be built at Granite City, Ill., the first of this type of mill to be constructed west of Chicago.

Building of the mills will take about seven months. The hot mill will be capable of producing plates up to 84-inch width and hot strip, in sheet or coil, up to 72-inch width, with the cold mill maximum width stated at 36 inches.

WISCONSIN IS MODERNIZING

Wisconsin Steel Works, South Chicago, Ill., subsidiary of the International Harvester Co., has authorized $2,000,000 for modernizing its No. 2 merchant mill, and $250,000 for installation of a new turbo blower in its blast furnace department.

LETS NEW MILLS FOR WARREN

Republic Steel Corp., Youngstown, O., has awarded the Lewis Foundry & Machine Co., Groveton, Pa., subsidiary of the Blaw-Knox Co., contract for two 3-high rolling mills complete with feeder and catcher tables for its Warren, O., works.

ALGOMA WILL EXPAND

Algoma Steel Corp., Sault Ste. Marie, Ont., plans to erect a sheet mill, a tin plate mill and universal plate mill, according to Sir James Dunn, president. Equipment is to be purchased shortly.

GREER STARTS ANDERSON MILL

Greer Steel Co., Dover, O., has begun construction work on its new strip steel mill in Anderson, Ind. The first building will be 170 x 700 feet. The plant will employ about 300 men.

TO MAKE STAINLESS INGOTS

Perfection Steel Co., of which B. F. Hardesty is president, has acquired 50,000 square feet of manufacturing space at 3311 West Seventy-third street, Cleveland, to produce stainless steel ingots by a new process. It will market the ingots among finishing mills.

INSTALLS NEW SOAKING PIT

A 10-ingot soaking pit now is being installed at the Mingo steelworks of the Carnegie Steel Co., Mingo Junction, O., by the Amsler-Morton Co., Pittsburgh. This pit, of the recuperative type, is the first continuous and center-fired soaking pit to be installed in this country. It is expected to be ready for charging in December.

MORE STANDS AT MIDDLETOWN

American Rolling Mill Co., Middletown, O., has awarded to the United Engineering & Foundry Co., Pittsburgh, the contract for an 80-inch 4-high mill stand to supplement existing stands of the continuous hot mill train at Middletown, which are being widened to 80 inches. This is in addition to an order booked by United recently for the equipment necessary to widen the present hot mills. United also will supply the accessory equipment.

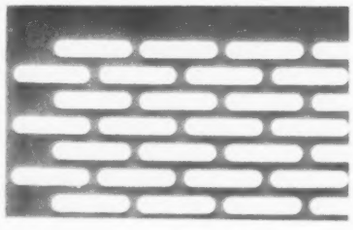
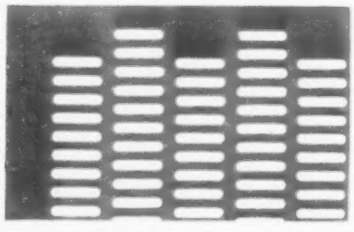
Equipment

For additional news of new equipment purchased or in prospect see heading "New Capacity" on this page.

Chicago—Machinery and equipment demand is more active, a large part of the pickup being attributed to interest developed by the recent machine tool exposition. The metal exposition held here the past week helped to stir similar interest in steel treating and metalworking equipment, and most reports indicated improved business prospects. Brisk demand was noted for certain types of laboratory facilities. While few large machine tool lists are pending, miscellaneous buying is heavier. Best demand is for lighter types of units and small tools. A pickup in sales is in prospect this month following the quietness caused in September by the tool show interruption.

Pittsburgh—Steel mill equipment builders in the Pittsburgh district are still operating on one of the heaviest backlogs in recent years. Many are employing their engineering and design departments overtime, and the shops of steel mill equipment builders, such as United Engineering & Foundry Co., Mesta Machine Co., Mackintosh-Hemphill Co., Lewis Foundry & Machine Co., and others in this district, are booked up for many months in advance. In some cases, the backlogs which the former equipment companies are working on will assure them of capacity schedules well into 1936.

Seattle — Machinery and equipment houses are enjoying an active fall season, stimulated by increased operations in logging camps and lumber mills. Used items are also in good demand. Business with Alaska is good, as isolated areas are stocking for the winter before navigation to Bering sea closes, mining machinery leading. Public works contracts also are adding to the demand for various types of equipment.

WE CAN FILL THAT ORDER AT ONCE

For 56 years our name has stood for quality in perforated products. We have done business strictly on the basis of supplying the best, and supplying it at once.

To establish our reputation has required the closest scrutiny of raw materials, a faithful, highly trained personnel, and the maintenance of adequate stocks of blank metals.

Erdle perforated sheets are widely used for FANNING MILLS, THRESHING MACHINES, PULP MACHINERY, ELECTRICAL DEVICES, VENTILATORS, GRILLS, and for hundreds of other purposes.

Your requirements can be met in Sheet Aluminum, Brass, Copper, Steel, Tin, and Zinc.

Let us quote to your specifications.

Write us today.

ERDLE PERFORATING CO.
171 York St. ROCHESTER, N.Y.
56 Years in Business

Construction and Enterprise

Ohio

BELLEVUE, O. — City plans pumping station and installing mechanical screens and pipe connections, costing $47,000; constructing high-speed pumper station and filter plant, costing $95,000; and improving distribution lines $40,000. PWA funds have been granted. G. B. Gascoigne, Leader building, Cleveland, engineer.

BLOOMDALE, O.—Municipality plans waterworks system, costing $41,000. George Champe & Associates, 1025 Nicholas building, Toledo, O., engineer.

CLEVELAND—Elyria Foundry Co. has been incorporated with $2500 capital by Charles Follett, Terminal Tower building, Walker H. Nye and James R. Stewart.

CLEVELAND — Scott Transportation Co., now consolidated with the Keeshin Motor Express Co., of Chicago, is moving its repair shop here immediately from Erie, Pa. A building has been leased at 3125 Croton avenue.

CLEVELAND—Perfection Steel Co., B. F. Hardesty president, has acquired 50,000 square feet of manufacturing space at 3311 West Seventy-third street, to produce stainless steel ingots by a new process.

CINCINNATI, O.—Reliance Art Metal Inc. has purchased a building at 601 West McMicken avenue for expansion purposes.

COLUMBUS, O. — Automatic Reclosing Circuit Breaker Co., 1304 Indianola avenue, has plans for erecting a plant addition. Estimated cost $75,000.

DAYTON, O. — Loose-Wiles Biscuit Co., J. W. Green manager, Cincinnati street, is planning to erect a 1-story, 110 x 500 foot, steel factory and storage building; also, an addition to its existing plant. Estimated cost $75,000.

FREMONT, O.—S. E. Hyman Co., manufacturer of automobile fabric accessories, has begun construction of a 2-story addition to take care of increased demands for its products. The addition will give the plant 16,000 feet more floor space. S. E. Hyman is president.

NORWALK, O. — J. A. Dombart is planning to reopen the Norwalk Drill Tool Co.

RUSSELLS POINT, O. Municipality plans waterworks system, costing $60,000. Jennings & Lawrence, 12 North Third street, Columbus, O., engineers.

YOUNGSTOWN, O.—Republic Steel Corp. has awarded contract to Lewis Foundry & Machine Co., Groveton, Pa., subsidiary of Blaw-Knox Co., for two 3-high rolling mills complete with feeder and catcher tables for its Warren, O., works.

Indiana

CHARLESTOWN, IND.—Town board, O. C. Carter president, has preliminary plans for waterworks system, costing $72,000. Finch & Babcock, 276 Century building, Indianapolis, engineers.

KOKOMO, IND.—Metal Specialty Co., manufacturer of stamped, formed and pressed metal products, Cincinnati, is establishing a manufacturing division here. A building containing approximately 95,000 square feet of floor space has been acquired and operations will begin in about three weeks. Fifty employes will be required, this number increasing as the stamping machine and press equipment is gradually increased in line with improving conditions and requirements.

Illinois

BLOOMINGTON, ILL. — Mechanical Devices Co., F. E. Sperry president, manufacturer of rotary pumps and oilless bearings will erect a new plant to handle increased business.

CHICAGO — Chicago Steel Wool Co., 312 Greene street, plans rebuilding its factory and storage building, at a cost of approximately $28,000.

CHICAGO—American Spring & Wire Specialty Co., 816 North Spaulding avenue, has awarded contract to F. Markewicz, 5000 George street, for erecting a plant. Estimated cost $60,000.

GRANITE CITY, ILL. — Granite City Steel Co. has placed contracts with United Engineering & Foundry Co., Pittsburgh, for construction of a 90-inch 4-high continuous hot strip mill and a 42-inch 4-high reversing cold mill to be built here.

SOUTH CHICAGO, ILL. — Wisconsin Steel Works, subsidiary of International Harvester Co., will expend $2,000,000 for modernizing its No. 2 merchant mill, and $250,000 for installing a new turbo blower in its blast furnace department.

Connecticut

NEW HAVEN, CONN. — Winchester Repeating Arms Co., 275 Winchester avenue, plans to build a steel addition to its boiler plant. Estimated cost $28,000.

New Jersey

ELIZABETH, N. J. — New Jersey Metals Corp., Newark, N. J., has acquired a foundry on Rockefeller street here. The metals concern will improve the plant and move from its present location in Newark.

Pennsylvania

GREENSBURG, PA. — Daniels & Miller Co. warehouse, housing scrap metals and machinery, was destroyed by fire Sept. 26.

Kentucky

LOUISVILLE, KY.—Jefferson Distilling Co. has been incorporated with $25,000 capital, by C. F. Allen and V. P. Powell, to operate a distillery.

Maryland

BALTIMORE. — Baltimore Dairy Co. is being organized by Asa B. Gardner to operate a dairy to be erected on Loch Raven boulevard. The initial unit will be equipped for 10,000 gallons daily and will consist of a 2-story main building and a power house.

Louisiana

JENNINGS, LA. — Lake Tool Co., Longview, Tex., will build a shop and distribution plant here, costing about $15,000.

SHREVEPORT, LA.—Shoreline Refining Co. plans to build a lubricating oil plant, and also a refinery addition. Estimated cost $75,000.

Florida

DAYTONA BEACH, FLA.—City will receive bids Oct. 11 for furnishing material, labor and construction of waterworks improvements. Principal units are: Building and structures; filter equipment, pump erection and piping; pumps, motors and controls, electric power and lighting wiring, elevated tanks.

FELLSMERE, FLA. — Fellsmere Sugar Co. will begin construction immediately of a sugar refinery, costing $50,000.

TAVARES, FLA.—John Barnes Co. Inc., Plant City, Fla., plans building a 1-story packing plant. Cost estimated

(Please turn to page 92)

PIONEERS
in Copper and Bronze Castings
for almost a half century.
LAWRENCEVILLE
BRONZE COMPANY
We specialize in the manufacture of *Blast Furnace Copper Castings*
MILL BEARINGS
HEAVY MACHINERY BRONZE
QUALITY CASTINGS ONLY
Send us your inquiries
BESSEMER BLDG. PITTSBURGH, PA.

WHERE-TO-BUY

A classified list of advertisers according to products. ¶Index to advertisements gives page number of any advertiser.

ABRASIVES (Polishing)
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

ACCUMULATORS
Morgan Engineering Co., The, Alliance, O.

ACETYLENE
Air Reduction Sales Co., 60 East 42nd St., New York City.
Linde Air Products Co., 30 E. 42nd St., New York City.

ACID-PROOF LININGS
Ceilcote Co., The, Rockefeller Bldg., Cleveland, O.

ACIDS (Pickling)
American Chemical Paint Co., Ambler, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

ALLOYS—See FERROALLOYS

ANGLES, CHANNELS—See BEAMS, CHANNELS, ANGLES

ANGLE IRON BENDERS
Excelsior Tool & Machine Co., Ridge and Jefferson Aves., East St. Louis, Ill.

ANODES (All Types)
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Standard Steel Works Co., Burnham, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

BABBITT METAL
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

BANDS—See HOOPS AND BANDS

BANDS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.

BAR BENDERS
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.

BARGES (Steel)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.

BARRELS (Plating)
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

BARRELS (Steel)
Pressed Steel Tank Co., Milwaukee, Wis.

BARS (Alloy)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Timken Steel & Tube Co., Canton, O.

BARS (Concrete Reinforcing)
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

BARS (Iron)—See IRON (Bar)

BARS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BATTERIES (Storage)
Thomas A. Edison, Inc., Orange, N. J.

BEAMS, CHANNELS, ANGLES, ETC.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BEARINGS (Ball)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Norma Hoffmann Bearings Corp., Stamford, Conn.
New Departure Mfg. Co., Bristol, Conn.

BEARINGS (Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.
Shenango-Penn Mold Co., Dover, O.

BEARINGS (Journal)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Oilless)
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.

BEARINGS (Quill)
Bantam Ball Bearing Co., South Bend, Ind.

BEARINGS (Radial)
Bantam Ball Bearing Co., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
New Departure Mfg. Co., Bristol, Conn.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Roller)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Norma Hoffmann Bearings Corp., Stamford, Conn.
S K F Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Roll Neck)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Roller Tapered)
Bantam Ball Bearing Co., South Bend, Ind.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Rolling Mill)
Bantam Ball Bearing Co., South Bend, Ind.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
Norma Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Thrust)
Bantam Ball Bearing Co. The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Norma Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., The, Canton, O.

BENDING AND STRAIGHTENING MACHINES
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Morgan Engineering Co., The, Alliance, O.
Thomas Spacing Machine Co., Pittsburgh, Pa.

BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Construction Co., 1438 Koppers Bldg., Pittsburgh.
Youngstown Sheet & Tube Co., Youngstown, O.

BILLETS (Alloy and Carbon Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Republic Steel Corp., Youngstown, O.
The Stanley Works New Britain, Conn. Bridgeport, Conn.
Timken Steel & Tube Co., Canton, O.
Washburn Wire Co., Phillipsdale, R. I.

BILLETS (Forging)
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Republic Steel Corp., Youngstown, O.
Standard Steel Works Co., Burnham, Pa.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Timken Steel & Tube Co., Canton, O.

BILLETS AND BLOOMS
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.

(*Concluded from page 90*)

at $60,000, with loading, conveying and other equipment.

South Carolina

ORANGEBURG, S. C. — City plans water treatment plant, deep well, pumping equipment, etc. H. F. Wiedeman, engineer, Candler building, Atlanta, Ga.

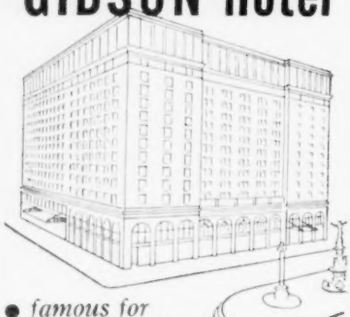
Tennessee

CELINA, TENN.—City, J. B. Hamilton, mayor, will soon call for bids for waterworks and distribution system, costing $40,000. C. N. Harrub Engineering Co., 711 American National Bank building, Nashville, Tenn., engineer.

FAMOUS LANDMARKS

Rome has the Coliseum

Cincinnati has the GIBSON Hotel



• *famous for its hospitality*

Travel is a pleasure when you stop at the Gibson. Modern in every sense. Experienced, helpful service. Marvelous restaurants. A thousand rooms — all with bath. Rates surprisingly moderate.

Rates—From $2.50 single; $4 double

F. W. PALLANT, General Manager

CHATTANOOGA, TENN. — Robert Scholze Tannery, 3000 Broad street, will build a 4-story, 80 x 150 foot, addition to the tannery on St. Elmo street. Estimated cost $100,000.

IRON CITY, TENN. — Hassell & Parkes Inc. has plans by Moore Dry Kiln Co., Jacksonville, Tenn., for rebuilding its dry kilns and boiler room.

MEMPHIS, TENN.—Carter Mfg. Co., 1132 Kansas street, manufacturer of trailers, has acquired a site, 150 x 215 feet, and will erect an addition. Nathan A. Carter is president.

MEMPHIS, TENN.—Standard Brake Shoe & Foundry Co., E. S. Dilley, president, Main and Bodley streets, will start work soon on erection of a $250,000 steel and iron foundry. An electric furnace will be installed.

MONTEREY, TENN.—City plans constructing sewerage system and disposal plant, costing $42,000. L. Brown, engineer, Cookeville, Tenn.

PORTLAND, TENN. — Clarksville Canning Co., Clarksville, Tenn., plans to erect a cannery here. Cost, including equipment, will exceed $50,000.

West Virginia

CHARLESTON, W. VA.—West Virginia Steel Corp., F. A. Price, president, 1646 Fourth avenue, plans erecting office building, plant and warehouse on Brooks street. The plant will be equipped for straight line steel production. Conveying, loading and other equipment will be installed.

Virginia

EMPORIA, VA.—Town has grant of $33,000 for constructing water tank and filter plant.

PETERSBURGH, VA.—Petersburgh Shook & Lumber Co. plans rebuilding its plant. Cost will exceed $28,000.

WINCHESTER, VA. — Roanoke Gas Light Co., R. C. Hoffman president, 121 Church avenue, Roanoke, Va., is receiving bids on proposed $58,000 gas plant to be erected here.

Missouri

POPLAR BLUFF, MO. — City plans waterworks and power plant improvements, costing $40,000. W. A. Fuller Co., 2916 Shenandoah avenue, St. Louis, engineer.

SHELDON, MO. — City, G. E. Bartholemews mayor, plans waterworks and distribution system, costing $35,000. W. B. Rollins & Co., engineer, 339 Railway Exchange building, Kansas City, Mo.

Oklahoma

MEDFORD, OKLA. — Medford Ice Co., E. S. Henry, will increase the capacity of its ice plant to 17½ tons daily, and will install additional machinery.

Texas

ALICE, TEX. — City, R. R. Graham mayor, plans waterworks improvements, costing $80,000. J. E. Ward, Harvey-Snider building Wichita Falls, Tex., engineer.

ALVORD, TEX. — City, J. R. Adcock mayor, plans complete waterworks and sewerage system, including installation of elevated storage tank.

DAINGERFIELD, TEX.—City, C. S. Truitt mayor, will construct a waterworks system, including installation of tanks, pumping equipment, filters, etc. Cost $85,000.

HOUSTON, TEX.—E. F. Dyer Mfg. Co. plans rebuilding its manufacturing plant recently damaged by fire.

HOUSTON, TEX. — George H. Dentler & Sons, 2116 McGowen avenue, has started work on erection of a $25,000 pickle plant. Vats and machinery will be installed.

HOUSTON, TEX. — Apex Construction Co., Second National Bank building, has acquired a site on Humble highway, comprising six acres, and will start work soon on erection of a corrugated iron warehouse, to house machinery and equipment.

PLEASANTON, TEX.—City, William Housewright mayor, plans waterworks system, and will install an elevated steel tank and pumping equipment.

SULPHUR SPRINGS, TEX.—City, Shade Gafford mayor, has loan and grant of $87,000 approved for waterworks improvements. Powell & Powell, engineers, Republic Bank building, Dallas, Tex.

TYLER, TEX. — Tyler Iron & Foundry Co. has been organized by Frank Nicholson, John W. Miller and R. H. Hedge.

Wisconsin

LACROSSE, WIS. — Allis-Chalmers Mfg. Co., Milwaukee, will take bids after Oct. 9 for construction of addition to branch plant here. Shop will be 152 x 300 feet, 1-story, and equipped for material storage and cutting and shearing operations, with an unloading crane as part of new equipment. Fred J. Papenfuss is local works manager.

LACROSSE, WIS.—County board has plans by Architect Wells Bennett, Hoeschler building, for new highway department repair and storage building, 80 x 200 feet. Frank J. Davy is highway commissioner.

MILWAUKEE — Pittsburgh Plate Glass Co., Patton division, has let general contract to Hunzinger Construction Co., 1827 North Thirtieth street, for new construction and alterations at Milwaukee paint, varnish and lacquer works, costing $300,000.

SHEBOYGAN, WIS.—Jenkins Machine Co., Sheboygan Falls, has received an order for $30,000 worth of woodworking machinery from the Soviet government through the Amtorg Trading Corp.

Pacific Coast

LOS ANGELES — Harbor Box & Lumber Co., W. E. Arblaster president, 1428 South Alameda street, has purchased a 15-acre site and plans to erect a factory, costing between $50,000 and $60,000.

YAKIMA, WASH.—Lampert Implement Co., 221 South First street, has been granted permit to erect a concrete warehouse and plant.

Dominion of Canada

VANCOUVER, B. C. — Columbia Shingle Co. Ltd. is considering erecting a plant, and will purchase necessary equipment. Estimated cost $30,000.

DESERONTO, ONT. — Deseronto Refineries Ltd., R. D. Perry president and manager, is having plans prepared for an oil refinery. The owners are interested immediately in prices of complete equipment. Estimated cost $100,000.